

THE SENSES AND THE HISTORY OF PHILOSOPHY

The study of perception and the role of the senses have recently risen to prominence in philosophy and are now a major area of study and research. However, the philosophical history of the senses remains a relatively neglected subject. Moving beyond the current philosophical canon, this outstanding collection offers a wide-ranging and diverse philosophical exploration of the senses, from the classical period to the present day. Written by a team of international contributors, it is divided into six parts:

- Perception from Non-Western Perspectives
- Perception in the Ancient Period
- Perception in the Medieval Latin/Arabic Period
- Perception in the Early Modern Period
- Perception in the Post-Kantian Period
- Perception in the Contemporary Period.

The volume challenges conventional philosophical study of perception by covering a wide range of significant, as well as hitherto overlooked, topics, such as perceptual judgment, temporal and motion illusions, mirror and picture perception, animal senses and cross-modal integration. By investigating the history of the senses in thinkers such as Plotinus, Auriol, Berkeley and Cavendish; and considering the history of the senses in diverse philosophical traditions, including Chinese, Indian, Byzantine, Greek and Latin it brings a fresh approach to studying the history of philosophy itself.

Including a thorough introduction as well as introductions to each section by the editors, *The Senses and the History of Philosophy* is essential reading for students and researchers in the history of philosophy, perception, philosophy of mind, philosophical psychology, aesthetics and eastern and non-western philosophy. It will also be extremely useful for those in related disciplines such as psychology, religion, sociology, intellectual history and cognitive sciences.

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Edited by Brian Glenney and José Filipe Silva

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Edited by Brian Glenney and José Filipe Silva

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One of the key issues in philosophy of perception, to which many of the contributors to this volume allude, is what properties can be represented in the content of a perceptual experience. Upon printing the whole manuscript before sending it to the publisher, the content of our visual perception probably included properties such as “mammoth,” “monolith,” “huge,” etc. It is always impressive to see the result of so much work during such a long period of time present to one’s own contemplation—and then, start looking out for typos, formatting errors, etc.

In the case of this volume, the process was pretty simple and straightforward: although we editors have never met in person (yes, true fact!), we quickly compiled a list of contributors who, to our surprise, mostly said yes, and the project moved swiftly—for editorial standards, that is—with very few last-minute cancellations. That allowed us to submit the whole volume close to the original deadline. The result is for the reader to judge, but we are as editors proud of the result and do think that this is a significant contribution to the field of the history of philosophy of perception.

We are thus extremely grateful to our contributors for their excellent work, especially that they submitted their pieces mostly within the set deadlines and then took the comments seriously and conformed to the suggestions in a timely manner. We are equally grateful to the editors of the *Rewriting the History of Philosophy Series*, in which this volume appears, Pauliina Remes and Aaron Garrett, for inviting us to edit this volume and gave us pretty much free rein on what to do. Finally, we would like to thank the philosophy publisher at Routledge, Tony Bruce, and his helpful assistant, Adam Johnson. We hope to have repaid their trust and patience with our enthusiasm.

On an individual note, I (José Filipe Silva) would like to publicly state that my co-editor, Brian Glenney, was the true soul of this project. Brian was simply the best possible partner in this project, dealing brilliantly and always with good humor with all the difficulties a project such as this one inevitably encounters. I am very grateful for his outstanding editorial skills and philosophical expertise, as well as his patience with my incredibly busy schedule. So, when we finally meet in person, drinks are on me! But until then, and even after that, thank you!

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GENERAL INTRODUCTION

Brian Glenney and José Filipe Silva

Few topics have merited more scholarly attention in recent decades than perception. This is true in what concerns both historical philosophical debates as well as contemporary ones in philosophy, cognitive science, and psychology, to name just a few of the fields involved in a truly interdisciplinary quest. Issues related to perception have driven the research on what human beings are because perceptual processes function as the interface (and/or buffer) of our interaction with the world, determining to a large extent what we believe and how we behave. That immediacy explains why much of the recent developments in theories of perception, especially in the context of naturalistic philosophy of mind and epistemology, use perception rather than understanding as the default on which to build their models of the human mind. What can be more immediate to us than the world and the objects in it that just seem to appear to us in a way that feels both evident and in no warrant of explanation? When we see, we take things to be as they appear to be, and this grounds our beliefs about how things are. Under normal conditions, we rarely doubt that correspondence assumption—that things are as they appear to be—and thus the way we take the world to be is fairly stable as befits normal human experience. Yet there are many reasons, both philosophical and experiential, to question those underlying assumptions, and that alone explains why debates over the nature of perceptual experience and related belief have been core issues in the history of philosophy. But to be immediate and important does not mean to be easy; hence, questions about the most basic form of interaction with the world that we call perceptual experience have resisted and defied easy solutions for millennia.

We would like to claim that recent interest in perception should draw increased attention to the relevance and richness of the philosophical history of perception and its problems. The resurfacing of some of these problems, like illusions, demonstrates not only the pervasiveness of perception as a philosophical problem but reveals that a better understanding of the history of these problems and responding theories of perception is important for student and professional philosophers, psychologists, and cognitive scientists. In fact, increased focus in contemporary philosophy reinforces the need for diverse historical philosophical research: this is grounded on the idea that only a clear grasp of *how* some of the questions have risen in historical context allow us to fully understand the nature of the contemporary debate and in the same way, with no fear of anachronism, how contemporary debates can serve to alert the issues at stake in some of the historical debates. It is a question of how some problems arise in the context of very specific theoretical constraints and how some others arise in isolation from those very same specific theoretical frameworks. What

exactly is the significance of historical contributions to contemporary debates is an interesting question, and an answer to it depends on the particular issue, problem, or thinker being considered; the same is true when contemporary debates contribute to resolving problems in the history of philosophy. The bottom line is that despite all the work that has been done to unveil the history of the philosophy of perception, much remains to be done, and this book intends to contribute to this process of discovery. Our originality rests on thinking about perception in the history of philosophy from a marginal perspective: *how* thinkers throughout the history of philosophy explain what happens to our perceptual knowledge when things go wrong, i.e. other than they should or are supposed to, and *under what conditions* do things go wrong. In that sense, the subtitle of this volume should be something like *Problems, Perceptual Errors, and Misperceptions*.

While traditional overviews focus on how philosophers past and present explain our getting things right despite all the problems we face in everyday perceptual experiences, our aim for this volume—both editors and contributors—is different: to offer our readers a deep and wide history of theories of perception in light of their problems, rewritten through the lenses of some of its most representative and underrepresented thinkers without restricting our inquiry to the Western canon. The idea is simple enough: by understanding how a given thinker or philosophical strand explains what happens when the requirements necessary for veridical perception fail to be met, we get a better grasp on what the standard or even optimal conditions for such an experience to take place are. Exotic theories, bizarre problems, and strangely strange insights await this more encompassing philosophical world, rewriting our past to reimagine our future.

The problem of history

If the book the reader holds in their hand has any explicit aim, it is precisely to show that the contemporary interest on the topic of perception should not let us forget its long and broadening history—a history that goes well beyond what convention calls “Western civilization.” This compilation of nineteen essays by a diversity of authors on philosophy and sensory perception includes essays on Chinese, Buddhist, and African philosophical accounts of perception, with essays on the influential ideas of women and people with disabilities. As such, this volume aims to broaden the canon of the history of philosophy to other philosophical traditions and to do it by means of a special focus on the problems of perception.

This volume also disrupts an often observed focus in traditional accounts in the history of philosophy on the normal cases of perception, that is to say how perception works when things go the way they should. Why? Because things hardly go the way they should! What these essays show, together with the inventiveness and acuity of philosophers throughout the history of recorded thought, is that some of the most interesting historical thinking on perception has started with considerations on the *problems of perception*, dealing with questions such as illusions or dreaming, blindness or divinely caused experiences. Two of the most striking features of perception when considered in light of its problems, which never cease to amaze those interested in the topic (including children!), are: (1) how *often* we get things right; and (2) how we get things right *despite* a clear poverty of the sensory stimuli we receive from the external world—despite limitations of our own sensory apparatus, seeing, as Locke noted,

“as a worm shut up in one drawer of a cabinet”

(Locke 1975: Essay, II.ii.3).

Whether it was the revolution in philosophy from empirical discovery, empirical methodology, or both, Locke’s historical context was, ironically, skeptical of knowledge gained

from the senses, compensated only by “over-the-counter”—or more precise “over-the-natural-realm”—remedies to this unreliability. Yet previous historical contexts, particularly those known as ancient and medieval periods, granted more trust in our cognitive systems *despite clear concerns about the reliability in general of our senses*. We emphasize the latter point to cast a suspicious eye on the general thrust of the “long-term historical perspective” argument: that problems in normal accounts of perception were not simply put aside as curiosities or inconveniences, but, rather, these phenomena were to be explained within a given theoretical framework so as to not compromise the merits of that theoretical framework. Different philosophical traditions or schools or strands (however one wants to call them) dealt with these problems in different ways, associating the non-veridical episodes (or simply problematic cases) with issues in the physical medium or with the perceiver’s perceptual, or even spiritual, apparatus. What is evident is that considerations about the causes for misperception have throughout history impacted the explanatory efficacy of theories, philosophers tuning their theories to account for both the normal (or “good”) cases and the problematic (or “bad”) ones. To continue the analogy, our study of historical accounts of perception reproduce chords and harmonies to enrich the interdisciplinary instrumental chorus of contemporary work on philosophy of perception, perhaps requiring today’s work to readjust to stay in rhythm and tone with the voices of the greatest minds of humanity’s past.

The problem of keeping with the harmony of history is its challenge to our contemporary conceptual categories. For instance, in our first essay on Chinese theories of perception, Jana Rošker invites the reader to consider the heart as an organ of sensory perception, a view still held by a significant portion of the world’s population. Also open for consideration is a Buddhist theory of perception, discussed by Stephen Phillips in Chapter 3, that the sensory organs of sight expand, rapidly bulging to make direct contact with their object, matching our phenomenological instinct that we *directly* see objects. These ideas of the senses do not align well with our contemporary Western categories and may easily be dismissed as primitive or unscientific. However, we can just as well use these ideas to expand our conceptual horizon of possibilities, appreciating their phenomenological accuracy.

Historical problems may also be uncouth to the contemporary reader yet provide insight into previously unconsidered features of perceptual experience. For instance, Peter Auriol’s account of perception is spurred by a perceptual oddity: if a burning stick is moved in a circular motion, one perceives a circle of fire, isolating a crucial temporal and cognitively active dimension to sensory perception as the chapters in the medieval Latin and Arabic period discuss. The medieval claim to the mind’s activity in sensory perception is challenged in Anton Amo’s “impassivity” claim: the human mind is completely absent in sensory perception, involving only the body. As discussed by Chris Meyns in Chapter 9, for Amo the mind–body problem necessitates the impassivity of sensory perception—we know perception involves the body and thus it *cannot* involve the mind given the body’s ontological heterogeneity to mind. Problems such as why the moon appears large on the horizon (or does it just appear close?), psychedelic drugs, and people with blindness answering Molyneux’s question—what the freshly sighted might see—inform and reform present debates in sensory perception, as our final section on the contemporary period suggests.

However, the problem of history is also the problem of contemporary discovery. The methodology of this collection of essays follows a pattern found today in other fields. The cognitive sciences are currently rewriting our understanding of sensory perception by investigating problem cases: brain-lesion-generating deficits such as Goodale and Milner’s discovery of blindsight, or introduction of massive modularity of sensory functions such as Marr’s 2½ D proposal for V1, or even what actions should be selected to ground our sympathy with others—the frame problem. Advancement in understanding sensory perception, in many ways, is significantly influenced by problem-finding and problem-resolving, a strategy not

unknown to the history of understanding philosophical ideas. J. L. Mackie's *Problems from Locke*, and recent additions from James Van Cleve, *Problems from Kant* and *Problems from Reid*, suggest a similar method for studying the history of philosophy.

The “problems” method involves clearly delineating a disruption to an otherwise coherent theory that causes a reflective moment of either resolving the problem with the resources available in the theory, extending the theory to encompass the problem, or abandoning the theory. Kuhn himself makes this clear by quoting Francis Bacon saying that “truth emerges more readily from error than from confusion” (1962: 18). Our aim is to apply this strategy to rewriting the history of sensory perception by moving the “anomalies,” which in more traditional accounts occupy the sideline, and bringing them to the center of the stage. With that purpose in mind, these essays, loosely organized around different spatial and temporal periods, will take these exceptions as the starting point of the philosophy of perception. These essays continue to rewrite history—to rewrite the history of the senses.

“Historical” periods

There are new and diverse voices featured in this history of sensory perception. They help us to inform and rethink received categories of history, including time-period designations. The first set of essays, “Problems of Perception from Non-Western Perspectives,” is a shot aimed at finding ways of remaining neutral and inclusive in our time-period designations while also acknowledging the Eurocentric sociopolitical history that largely informs the anticipated readers of our volume. Other period designations—ancient, medieval, early modern, post-Kantian, and contemporary—are thus not meant to reinforce traditional designations but are set out to be interrogated, and perhaps for redesignation in future research. Not unlike the content of the essays that starts from problems, the presented “period” categorization of these essays we take to be problematic and, we hope, will be addressed in future work.

This volume is an addition to an ongoing “decanonization” or even “anti-canonization” movement in the history and practice of philosophy that seeks to question why certain authors, texts, and overarching idea themes are viewed as philosophical authorities and gatekeepers. For instance, why take seriously ideas like idealism, including their authors like Berkeley and related texts—often perpetuated as philosophical long shots—rather than the equally remarkable and non-commonsensical “impassivity” claim by Amo mentioned above? Is it a turn of mind or a turn in social norms that drives one canonical view and related materials to the top and another to the bottom? We ask these questions with an open hand and submit this volume as an example of how to include these canonical narratives beside counter-narratives to rethink and reimagine the future use of ideas, authors, and texts. Note: an example of constructing such a counter-narrative via Amo's impassivity claim is considered in the Introduction to Part IV, “Problems of Perception in Early Modern Philosophy.”

Lastly, it is important that we acknowledge the challenge of a more inclusive canon—that of redirecting attention away from philosophers of greatest acclaim. For instance, the informed reader may scan over this volume's table of contents with a quizzical expression as they identify that direct discussion of the most influential philosophical lights: Plato, Aristotle, Descartes, among others, is missing. This is redirection. We do not doubt their importance but rather wish to emphasize it by way of the study of their influence. This influence includes lesser known philosophers: Plotinus cannot be read without Plato in mind, post-Aristotelian theories of perception are, obviously, backdropped by The Philosopher, and Amo's view of perception is a direct challenge to Descartes. Our strategy of decanonization is to make room for the direct examination of new philosophers and new ideas. By virtue of this study, we continue the study of those who influenced them.

Problems of perception

Our volume is not meant to be comprehensive in any sense, whether in terms of problems, authors, or historical periods. Rather, this work is a kind of bestiary of problems that are of interest and influence. A brief guide is thus due to the reader, but one that will emphasize problems as starting points. In doing so, it might help to loosely categorize these problems into three sorts: global, local, and meta-local as follows:

- *Global problems are without a theory*, understood more as theory generators. For example, as we discuss below, (1) the problem of how perception bridges the gap between the external world and the mind and (2) how perceptual error is possible.
- *Local problems are within a theory* in need of reconciling with what is commonly viewed as essential to perception: for example, the problem of light propagation in vision or mis-perceiving objects due to poor conditions.
- *Meta-local problems stand apart from theory* and lead rather to knowledge of the sensory mechanisms themselves. For example, both mirror perception or cross-species sensory comparisons generate understanding of mechanism over theory.

Let's consider these categories as they play out in this volume, from global to local to meta-local. In many ways, this serves as an overview of the entire set of essays, allowing readers to access each paper's ideas in a shortened format, though not necessarily in chapter order.

Global problem 1: mind the gap

We begin with the global problem of *how perception bridges the gap between the external world and the mind*. Chapters 1, 3, 6, 7, and 10 discuss and respond to the gap problem with a consensus that the mind and world must share a physical-like substate. Chapter 1 describes an answer from a non-Western perspective: a theory of reference grounded on an intentional “‘human heart-mind,’ which is mutually congruent with the structural patterns of the external world” (Rošker, p. 25). The heart acts as a kind of internal sensory organ that has innate structures that parallel the external world structure. As Susan Blake explains later in Chapter 2, “The heart, the seat of thinking as well as feeling, is not a non-physical entity, but another organ like the eyes and ears, having particular functions; and the sense organs are the same in kind as the objects of sensation” (Blake, p. 34). The heart unifies perceptual spaces into a diverse yet coherent picture of reality through relations to external structures. It then turns out that these relations are fundamental to Chinese thought. “This results in a profound metaphysical picture of reality where ‘relational links are all that exists in the universe. Reality is nothing but a network of well-designed structures’” (Rošker, p. 18).

In Chapter 5, we find a parallel move by Plotinus, where the soul and the universe share a kind of substrate, “the soul needs to be embodied, if it is to be able to perceive items in the natural world” (Marmodoro, p. 81). Plotinus is thus motivated to posit a metaphysical hybrid, “an intermediary whose matter is in between mental and physical stuff somehow ‘reduces’ the existing categorial gap between the soul and physical objects” (Marmodoro, p. 93). To posit *ad hoc* a kind of intermediary substance as a relational link between mind and world will not do, a critique that we find in Chapter 9 in a response to Descartes’ mind-body problem by the African philosopher, Amo, who argues, “Sensation and the faculty of sensing belong ... to the body” (Amo 1738; see p. 171). As Meyns explains in their essay on

Amo, “The human mind, as far as Amo is concerned, does not sense. Rather, mind operates fully spontaneously, and uses the body as an instrument in its operations” (Meyns, p. 175).

Another strategy involves no direct causal action between mind and world but, rather, an “occasional causation” that allows for minds to engage in free action. This is the view of Margaret Cavendish who reasons by the following analogy. “A Watch-maker doth not give the watch its motion, but he is onely the occasion, that the watch moves after that manner, for the motion of the watch is the watches own motion, inherent in those parts ever since that matter was” (Cavendish 1664: 100; see Boyle, p. 234). A cat acts cat-like and, being a cat, will purr and play, but will not act in a determined way. As Deborah Boyle discusses, Cavendish believes that matter is not only free but also perceiving: “all other parts of Nature are also able to perceive objects external to themselves, even if they do not have sense organs such as eyes or ears” (Boyle, p. 235–6). Perception is nothing but the producing of “patterns” of other activity, allowing for numerous kinds of illusions and hallucinations—false patterns based on poor attention, inclusion of creative thought, or irregular motions in either the sensory organs or in the objects themselves. Cavendish can thus account for error in a way not available to direct or mechanistic theories of perception, like that of her predecessor Hobbes, while also being thoroughly materialistic, unlike Leibniz.

The gap problem is a global problem in that there exists several theories such as the above oriented around how this physical-like substrate involved in perception, whether it be called the mind, a hybrid soul, a heart, or a body must bridge this gap. But even if one has no theory of mind–world mediation, its sensory mechanics also spotlight a global problem: is vision a passive receptor of light, an intromission, or is it an extramission, beaming out something to mediate sight? Regarding the latter “extramission” accounts, we see three discussed in our volume. In the Buddhist theory of perception, discussed by Stephen Phillips in Chapter 3, our sensory organs are thought to expand with their sensory medium: the eyes bulge at light speed to spread over illuminated surfaces, ensuring direct contact with their object, or our eyes “laser beam” objects in a process of active reception as discussed in post-Aristotelian accounts of vision by Katerina Ierodiakonou in Chapter 4, or Plotinus’ claim that our hybrid soul “possesses” objects of perception discussed by Anna Marmodoro in Chapter 5.

Several problems are associated with the extramission view, two of which are discussed in Chapter 5. The normal visual process requires light to either emit or refract from objects to the eye. But does this light have to itself be lit? In other words, just as we might ask if water is wet, we can also ask whether light is lit, or, conversely, if light becomes dark when it travels through darkness. In other words, if light is lit, then it should not be able to persist in darkness as suggested by the Aristotelian commentator Alexander of Aphrodisias, who documents the problem in two distinct ways:

- 1 Why we can see into an illuminated room from the dark but not in the reverse direction?
- 2 Why two people can see one another from rooms that are opposite and illuminated, although it is dark between the two rooms?

It is not clear that these are problems reserved for extramission theories as they may also issue problems for intromission theories that take light to require being lit for it to exist, rather than reducible to a particle or wave that has properties that do not concern light propagation directly. It is also not clear what led to the demise of extramission theories and the rise of intromission theories accepted today, other than experimental work that showed light to not propagate from the eyes but rather to be received by them. To explain this

historically by the success (in the Latin West) of the criticism to the view presented by Alhacen is to rely both on a contingent fact and an argument from authority. But Alhacen's lengthy arguments against extramission did strike a chord in the philosophical core of the theory by revealing that in most accounts of extramission the sending forth of rays required a return of these rays to the eyes, thus duplicating (unnecessarily) the mechanisms of visual perception. Experiential evidence was also called upon to pass judgment on this, namely by showing the contrast between our immediate perception of distant objects, like stars in the sky, and the necessary time-consuming process of extra and intromission. Why not then to simply focus on the receiving eyes? But in turn this focus on the sensory organs promotes another global problem of "error."

Global problem 2: sensory fails

If we mind the gap by using similar substrate and furthermore depend on our senses to survive and thrive, it is not obvious why or how perceptual error is possible, a topic discussed in Chapters 2, 3, 7, and 9. Consider again Chinese philosophies discussed by Blake in Chapter 3 that blame the stability of their preferred sense organ, the heart: "Problems arise, however, when the heart is not stable, and I argue that these can lead to substantial error, if not external-world skepticism" (Blake, p. 43). As Blake points out, there exists two problems regarding error: why is it that we err, and, since we do not know when our senses fail to provide accurate perception, it could be that our senses are in extreme error and provide no knowledge—no truth—about the external world. Consider a most ancient text quoted by Blake, the *Annals*, which describe categorical errors, or naming errors:

Suppose a person seeks an ox calling it a "horse" or seeks a horse calling it an "ox." He certainly will never find what he seeks... Speaking of wisdom and mastery of a subject but being in fact stupid and careless; praising the eminent and worthy yet surrounding oneself with the mean and low... The expressions "What one thought was white turned out on second glance to be black" and "The more one seeks it, the less one finds it" surely have this meaning.

(Blake, 17/1.4, in Lü 2010: 408)

These "ox as horse" errors appear to be related to the senses but find their root in judgment, applying the wrong idea to a perceived object.

The role of judgment in the senses, what might be called a concept-laden perception is, then, an ancient idea. But, as Stephen Phillips notes, it did not constitute a problem for Buddhist theories of perception that believed that "perception is none the worse for being concept-laden in that concepts are features of the world as impressed upon our minds" (Phillips, p. 52). As Phillips continues, "A verbalizable perception of a cow has its intentionality directed toward the real cow, not toward sense data, not toward what some call sensory objects proper such as colors, shapes, and sounds" (Phillips, p. 52). These errors of judgment were known to be distinct from errors of the senses themselves, where a mis-applied concept was due to false appearances, like the silvery look of a shell make it look to be of silver.

The inclusion of perceptual judgment in perceptual processes remains a topic of significant debate today, and, as Toribio's chapter discusses, seems to be a unique hybrid of reason and experience. She writes:

Perceptual judgments occur without us realizing it. They are not something the subject does but something certain subpersonal perceptual mechanisms do. There is no agency involved, no voluntary mental act performed by the subject, nothing like a subject's endorsing the truth of a proposition. They are effortless, automatic, unintentional, and stimulus-driven—just like perceptual experiences.

(Toribio, p. 301)

Toribio's analysis concludes, "Perceptual judgments thus sit at the divide between perception and central cognition, processing information that comes in an analog and fine-grained format (the information provided by the experience) and turning it into a digital, coarse-grained and conceptual, but still perceptually based, format" (p. 303).

In the context of perceptual error, perceptual judgments appear to be a unique form of error that requires additional intellectual resources to correct and dovetails with past attempts at distinguishing between errors of concept application and errors of judgment based on faulty sensory apparatus, and could be used as a means for adjudicating more extreme forms of skepticism. In other words, the local problem of what perceptual judgment is provides a way to resolve more global problems.

A local error theory—an explanation for why specific sensory errors take place—provides a means of stemming extreme forms of skepticism that suggest no knowledge can be provided through the senses. Note, for instance, a common response to dreaming problems in the medieval period in José Filipe Silva and Juhana Toivanen's essay, "of why things in dreams appear as if they were real. When one is asleep, the connection between rational judgment and the internal senses is blocked or disturbed due to the movement of animal spirits, and reason cannot intervene in the process" (p. 116). Here, dreaming is defined in terms of a detectable disconnect between the senses and rational judgment that provides a basis for knowing when one is not dreaming. Another example from Silva and Toivanen's essay is seeing over great distances, a context that is known for producing unreliable perception. "Imagine, Alhacen asks the reader, that you move in the direction of the moon, and, despite your speed, you never seem to get closer to it. Thus, you infer that the moon is moving away from you at least at an equal speed" (Silva and Toivanen, p. 118). Another unreliable context, pointed out in H. T. Adriaenssen's chapter, is being in motion, a context that Wodeham notes can easily produce mistaken perceptual judgments. "As Wodeham puts it, the appearance of moving trees is not the vision of some kind of apparent motion but rather 'an erroneous judgment that is caused as a result of the vision' of immobile trees from a moving vantage point" (Wodeham 1990, cited in Adriaenssen, p. 153).

Local problems of perception caused by unreliable contexts of great distance, or being in motion, or dreaming all can be handled at the local level *if* they can be isolated as such from more reliable perceptual contexts. Speaking to motion-caused illusions, "[a] close analysis of this illusion, Auriol believes, will teach us some important facts about the basic mechanisms of perception" (Adriaenssen, p. 150). In other words, local problems provide a basis for experimentation and hypothesis that can lead to a distinct kind of knowledge—a meta-knowledge almost—of how the senses operate in conjunction with rational judgment.

It is tempting to add a category of problems of perception of this order, an order of "meta-local" problems—problems that promote knowledge of the mechanisms of perception for purposes of knowing about the mechanisms rather than for purposes of providing reliable knowledge by staving off global problems. Consider, for instance, the problem of mirror perception: "The question is: what appears *to them* in each mirror and how?" (Lička, p. 131). Several properties differentiate direct perception of objects from perception of objects through a mirror:

[Mirror perception] is ... observer-dependent: its location changes depending on the observer's position; the whole scenery seen in the mirror is reconstituted every time the observer moves. Further, the mirror image is perceptible to one sense alone: unlike everyday objects, mirror images can be seen but cannot be touched.

(Lička, p. 132)

Mirror perception, then, isolates sensory perception to an observer's particular location via their visual sense alone, eliminating otherwise confounding variables to focus on visual perception not unlike a scientist using controls for isolating a feature in an experiment. To solve the mirror problem provides a rather astonishing insight into visual perception—it moves in a straight line. As Lička concludes in his analysis of Auriol's discussion of mirror perception, "Hence, the object seen in the mirror seems to be on the prolongation of an imaginary straight line drawn from the eye outwards" (p. 142).

Picture perception provides an additional window for seeing the important role of meta-local problems. Ferretti's essay in the contemporary period describes the problem:

There seems to be, undoubtedly, a crucial difference between seeing a flower in a picture and seeing it face to face: only the latter offers our visual experience the visual feeling of presence ... when facing a depicted apple, the same spatial and motor relations we can entertain with a real apple.

(Ferretti, p. 308)

The basis of differentiating between seeing pictures and real objects seems to be visual processes seeing surfaces. But when I see a picture I don't seem to spend time examining its surface—or am even aware that it has a surface. Rather, I attend to the object being depicted just as I attend to the meaning of words rather than their letters. This realization provides an additional insight into the nature of visual experience, "in pictorial experience, we consciously see the depiction while unconsciously seeing the surface" (Ferretti, p. 312). In other words, we are unconsciously attentive to numerous features of objects in our visual field, including the manner of their depiction.

This method of using proposed solutions to these meta-local problems for insight into sensory mechanisms is particularly obvious when it is corrupted, such as when the method is inverted—when a theory of perception is used to explain a local problem. Take Wodeham's intriguing discussion of whether dogs suffer from bent-stick illusions found in Chapter 8. In spite of noting that dogs appear to fall for the illusion: "it will often move its paw not to the actual location of the stick but to a place where the stick appears to be to a human perceiver" (Adriaenssen, p. 155), Wodeham believes that dogs cannot fall for the illusion as perception requires linguistic mediation: "in order for a dog to have anything like the human appearance of a bent stick, it must be able to form a sentence saying that the stick is bent" (Adriaenssen, p. 155). Thus, "Because dogs lack the ability to form sentences such as 'the stick is bent,' Wodeham concludes, it is wrong to say that the stick appears bent to them" (Adriaenssen, p. 155).

Wodeham's misuse of the methodology of meta-local problems is insightful, particularly as it continues today, as Clare Batty points out in Chapter 18 regarding a similar debate about sensory differences between animal species. She takes William Lycan to task for propagating a commonly believed theoretical assumption that human smell is inferior to that of other animals, such as dogs, lacking in object representation altogether due to its informationally poor status. Batty's application of the meta-local problem methodology, as it were, leads to a

bottom-up investigation of the empirical bits of the problem, arguing that, “human olfaction is ‘highly sensitive and discriminative’ despite its phenomenology” (Batty, p. 329). In fact, regarding some smells, human olfaction is superior to canine, “as Laska stresses, we have a higher sensitivity than dogs in five of fifteen odorants. These odorants (e.g., n-pentyl acetate and β -ionine), he tells us, are components of plant odors and, as a result, likely do not have ecological significance for dogs” (Batty, p. 332). If we consider the empirical facts absent of a pervading theory, we can make significant discoveries of the sensory mechanisms themselves suggesting that some cases invert the Kantian claim to say that experience *with* concepts is blind.

Not surprisingly, much of our volume is taken up with disentangling persistent philosophical “top-down” theories from the local problems they endeavored to solve, often using meta-local problems to do so as we saw with Batty. Both Robert Schwartz and James Van Cleve put Berkeley’s attempts to account for visual experience in terms of learned associations from tactile perception in the context of local problems Molyneux’s question or the moon illusion, respectively. For instance, consider Van Cleve’s phenomenological response to Berkeley’s claim that, at bottom, the moon’s large appearance is due to an error in tactile judgment:

I find this suggestion phenomenologically incredible. When the horizon moon looks larger to me, I have no thought or impression whatever of any tangible attribute—no thought of hugging the astronomical moon, no thought of enclosing a silvery disk within my fingertips and feeling the distance between them proprioceptively, no thought of pressing my palm against an array of nubbly tangible points.

(Van Cleve, p. 227)

Schwartz takes a slightly different route, attacking a common interpretation of Berkeley: that visual experience lacks any structure or organization without touch. Schwartz points out that the local problems Berkeley discusses presuppose some kind of structure to vision. For instance, in even asking Molyneux’s question,

the [Man Born Blind (MBB)]’s task would be impossible if his visual field were unorganized. It is assumed that the stimuli ... have different visual shapes ... Berkeley says, “The proper immediate object of vision is light, in all its modes and variations, various colours in kind ...; various in their *order and situation*.”

(Berkeley 1948–1957: 44, *emphasis added*; see Schwartz, p. 213)

This revision to standard interpretations of Berkeley is more in concert with our contemporary picture in vision science. It is possible to reinterpret Berkeley’s views in a way that makes them more reasonable in light of recent empirical advances.

Global problem 3: sensory integration

Molyneux’s question is at the crux of a further global problem which is associated with both the sensory gap and sensory fail problems: that of the gap between different sensory organs. Or, as Van Cleve puts it, “what makes a given object $T(x)$ the tangible correlate of some visible object x ?” (Van Cleve, p. 228). The fact that we do not seem to fail to correlate sensory experiences of the same object is rather surprising given that the differences between the senses are often thought to be rather significant, as in the case of olfaction, discussed

above. For instance, to Berkeley, the gap between sight and touch is as significant as that between the mind and world, being of “two different worlds.” This has promoted a rather shocking line of thought initiated by Platner, that people with blindness lack a concept of space altogether: “The sense of touch, by itself, is altogether incompetent to afford us the representation of extension and space. ... [A] man deprived of sight has absolutely no perception of an outer world, beyond the existence of something effective, different from his own feeling of passivity” (Hamilton, *Lectures on Metaphysics*, XXVIII.174).

In his chapter on Molyneux’s question, Brian Glenney takes this view to task for both its intellectual (it is false) and social (it is oppressive) harm by presenting two answers to Molyneux’s question by persons with blindness.

In the most perceptive of these answers, Pierre Villey states a view similar to that of Berkeley’s “two worlds” view but distinct from Planter’s non-spatial view, stating:

The outlines of the chair are determined for the eye by an impression of coloration, and it is the color which, immediately projected from the eye and objectised, marks, at every point, the exact frontier between the object and the surroundings in which it is placed. As regards touch, it is the impression of resistance which supplies the same limit, a complex impression, as we know, for it consist of the play of muscles and tactile nerves, and it is generally localized very distinctly in these organs.

(Villey 1930: 184; Glenney, p. 274)

Though Platner agrees that sight and touch are distinct, they are *both* informed by a similar kind of spatially and tactilely fragmented set of sensations:

And, just as touch has diverse sensitivities in the fingers, hand arm, etc., so too does the eye: “In every retina there are spots more sensitive than others ... the role of attention is to look round on the surface of the object in such a way as to make the various parts come into relations with the sensitive spots and to bring them into evidence.”

(Villey 1930: 184; see Glenney, p. 276)

We can thus conclude that the same perceptual process that provides the unity of visual space also provides for a unity of tactile space, providing a basis for acquiring concepts of space for people with blindness. And though this can help begin an intellectual shift in how we view people with blindness, there remains a fundamentally problematic stigma that can begin to be corrected by returning to the work and testimony of people with blindness:

From the basis of having a “minority sense-field,” as it were, people with blindness like Husson require a reconsideration of their testimony that was previously undercut by a history of testimonial injustice. The basis of past judgments on people with blindness as “other,” was grounded on *a priori* assumptions about what is bad or suboptimal as influenced by ocular bias, societal stereotyping, and sensory prejudice. We combat these assumptions by considering direct testimony of people with blindness without the context of deficit or difference.

(Glenney, p. 271)

Glenney’s presentation of two answers to Molyneux’s question from the testimony of people who are blind can begin the reclamation of voices from the community of people with disabilities.

It may seem bizarrely off to think that a person with blindness might be able to answer a question that is fundamentally about new sight, or, as Foucault understood it, the freshness of “innocent” experience. This criticism is strengthened by a novel interpretation of Locke’s own understanding of Molyneux’s question that did not involve the question of how touch enters into the newly sighted experience. “As [Locke] puts it, he’s interested in examining the role of ‘Judgment’ in visual perception, in particular, how judgment can ‘alter’ ‘Ideas we receive by sensation’...So far, however, there is no mention of tactual perception at all” (Levin, p. 186). Thus, what is it that the newly sighted see at their first view of a ball, *pace* their tactile knowledge? Is it, as Locke infamously writes, “a flat Circle variously shadow’d” (1979: II.ix.8). If so, what does *that* look like? Is it sufficient for 3D shape identification? If not (Locke answers the question “not”), why not? In fact, as Levin argues, Locke should have answered “yes,” as his account of visual perception should allow it. “Globe recognition can thus occur *directly* (via ideas that, though intrinsically ‘flat and shadowed’, come to function as ‘globe-ideas’), without any cognitive intermediary” (Levin, p. 189). After all, the flat and shadowed appearance of the globe is an appearance that represents a globe. Levin concludes of Locke’s view of the Man Born Blind:

“[Y]et [the MBB] has not yet attained the Experience, that what affects his touch so or so, must affect his sight so or so” can be read as the claim that, though the MBB knows by experience how 3D objects from different angles feel, he has no experience yet of what 3D objects, from various perspectives, look like. But once he realizes that there is a single 3D object that can affect his sight by producing the variously shaded circles he sees by looking at the globe from different angles, he has enough experience for judgment to work on and transform.

(Levin, p. 190)

Levin’s interpretation sets out new territory for examining the role of Locke’s answer to Molyneux’s question in his overall account of perception, and that of his empiricist followers.

The final chapter in our volume points out that the process of unifying fragmented sensations into an ordered and unified perceptual experience is informed by the ability of the brain to process new information in novel ways—by its plasticity. This can be seen when novel technologies are brought to bear on sensory perception, such as sensory-substitution devices that employ a sense-like touch to acquire otherwise visual sensations:

The rapidity of the cortical reorganization, in other words, highlights a set of pre-existing co-ordinations between parts of the visual and somatosensory (tactile) cortices, so that submodalities of touch and of vision effect functional equivalences. In other words, although there may not be absolutely plastic cross-modality between all senses, in the wake of MQ [Molyneux’s question] we are becoming aware of some underlying neurophysiological clues as to why.

(Patterson, p. 345)

As Patterson explains, while the transfer of information from touch to sight lacks the immediacy anticipated by affirmative answers to Molyneux’s question, the fact that such transfers are primed may be sufficient to answer “yes.” But does this incorporation of novel sensory experience make us better perceivers? More generally, what is an optimal sensory experience? And as discussed above, can people with sensory deficits like blindness be considered to have optimal sensory ability in their other senses, like audition or touch, given known

discriminatory ability in the senses that work? The question itself, according to Madary's interpretation of Husserl, demonstrates a faulty theory of perception.

Madary considers a case of yellow-tinted vision caused by taking santonin, a type of case not limited to vision as, "perceptual abnormality can occur due to a change in the perceptual organ itself ... such as a touching something with a blister on one's finger or when we are crossing our eyes" (Madary, p. 256). Consider Husserl's thought experiment:

[A] community (*Volk*) of color-blind people who pass on [the color-blindness] trait across generations. New generations would constitute the "color-blind" visible world as normal. Husserl then considers the scenario in which the congenitally color-blind community comes into contact with a community such as ours, which is not color-blind. He suggests that the congenitally color-blind would accept that their visual perception is not optimal relative to ours just as a color-blind individual born into our community would.

(Husserl 1973: 133; Wehrle 2015; Madary, p. 263)

Optimality, thus, is in the eyes of the community of meaning rather than in some abstract objective standard. More generally, "Perception, for Husserl, is an ongoing process of anticipation and fulfillment" (Madary, p. 257). This process is informed by communities of meaning, as these communities are the purveyors of knowledge, "perceptual normality and abnormality is always *relative* to an intersubjective community of perceivers" (Madary, p. 263).

With this overview of the problems of perception covered here, we assert subversive traditional philosophical overviews of perception by starting from the problems any theory of how we come to know the external world, its objects and properties, faces and how tackling these problems in different historical contexts gave rise to alternative models of perception and in some cases shift the overall conceptual framework of those philosophical debates: from the nature of the objects of perception to the reliability of perceptual knowledge, from concerns with representationalism to considerations of the divine origin of sensory data. The commissioned essays individually and as a totality aim at offering this novel picture of the historical developments of the philosophy of perception. Our expectation is that this set of articles on the problems of perception, coupled with the traditional overviews on perception focusing on the successful cases, will allow students, laypersons, and professional philosophers alike to get new understanding of the problems and the solutions millennia of philosophical thought had to offer on how we perceive that which is being offered to us: the world.

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PART I

Problems of perception from non-Western perspectives

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INTRODUCTION TO PART I

Brian Glenney and José Filipe Silva

A person who walks in the dark sees a stone lying on the ground and mistakes it for a tiger lying in wait ... This is because the darkness obscures his clarity of vision. A drunkard tries to leap over a gorge a hundred paces wide, mistaking it for a ditch a half step across ... This is because the wine has disordered his spirit. If you press on your eyes and look, you will see one thing as two ... This is because the conditions have disordered your senses. Thus, to people looking down on cows from on top of a mountain, they will look like sheep, but those seeking their sheep do not go down to lead them away, because [they understand that] the distance has obscured their true size...

(Xun Kuang, third-century BC)

The problems of perception are saturated in everydayness, as Master Xun recognizes some 2,300 years ago in the quote above. However, our perceptions also appear as a unified and constant stream of interaction with the external world. It takes a certain kind of reflective examination to identify the kinks and quirks of our sensory interactions: an examination called “philosophy.” Philosophical questioning, as Xun demonstrates, is not relegated to a locale or time. There is no “time period” or “civilization” that such examination is limited to. Nor is it fundamentally a practice of certain genders, orientations, neurotypes, or body types. To engage in philosophical problems is a practice and pursuit available to all. And, like such other unifying pursuits as sport or craft, the ways in which it is pursued are diverse, with individualized inflection and socialized modulation.

To read “Chinese” or “Indian” philosophy, to which this section is devoted, invites a broader question: to what extent do spatial or temporal localities matter to philosophical thought? We might speculate that when we think we are more influenced by local peers than otherwise, dealing in the problems and theories that arose then and there, allowing assumptions adopted by *that* time and place. For instance, from a “Western” perspectives, we tell a story of general optimism of ancient and medieval periods in acquiring reliable sensory knowledge of the external world that turns to skepticism at the early modern scientific turn, and renewed optimism using new empirical methodologies throughout the nineteenth century to today. Is there anything about this narrative that is truly “Western” though? Yes. And no.

Yes, in that Western theories employed to explain reality appear less comprehensive and more reductive than their non-Western counterparts. Regarding the latter, the entirety of the universe appears to be involved in the smallest and most local acts of perception, and each act is holistic, involving not just epistemic features but emotional and moral ones. A typical non-Western theory seems networked into a theory of everything, by which we mean a model of cognition aiming at being all-encompassing rather than at fragmentation and compartmentalizing aspects of the world and mind. Consider, for instance, the basic assumption of Chinese thought that the structures of perceiver and object are mutually compatible—the cosmos is unified and ordered toward comprehension. Musical structures, for instance, are so ordered as to sync with emotional structures. So too are object structures ordered as to unite with belief structures, generating their perception. When these structures of world and mind are fused, objects are comprehended, i.e. known.

This is not to say that there are not parallel holistic perspectives in Western thought, supporting the notion that there is nothing special to Western thought. In addition, the non-Western universe of ideas is analytically and reflectively assessed, inviting problems and questions that parallel those found in Western thought. Both invite similar examining questions. What is the ontological status of the structures of mind and world? Are they physically existing or a void? Are they static or active? And what happens when structures fail to sync? These are not just problems of philosophy from a non-Western perspective but just the problems of philosophy.

Our three essays emphasize both the uniqueness and the commonality of the problems both Western and non-Western philosophical traditions face. Consider the first paper of this section by Jana Rošker: “Chinese Theories of Perception and the Structural Approach to Comprehension.” She reorients the question of perception away from “Western” approaches of reference toward the structural relationships that exist between perceiver and object perceived, inviting the concern over whether Chinese thought can even be considered a “philosophical” perspective if only considered in a Western context. Her response is direct: “Chinese philosophy” is not geographical but, “rather, an expression of the cultural conditionality that defines a certain form of philosophizing, or a certain system of philosophical thought, with a typical paradigmatic structure” (Rošker, p. 22). One feature of Chinese thought is its structural emphasis, exemplified in the notion that perception reveals relations of reality rather than it being of some independent feature of reality, a topic of considerable interest in Rošker’s essay. As she concludes, “In this view, relational links are all that exists in the universe. Reality is nothing but a network of well-designed structures” (Rošker, p. 29). Understanding this claim is, she argues, not possible from a Western context, suggesting that a heterogeneity of discourses may need to exist in parallel between the Western and the non-Western traditions. We must study them both if we are to understand the nature of perception.

To help us along this non-Western path of study, Susan Blake’s contribution, “Perception and Its Disorders in Early China,” emphasizes the non-representational nature of perception for Chinese philosophy, one which brings out the contrast of the non-Western perspective where theories under the headings “empiricism” and “realism” fail to capture the ideas persistent in non-Western understanding or knowing, being, or perceiving. In addition, Blake discusses how the heart, namely the organ that pumps blood, is itself a sensory organ in Chinese thought, along with the other external organs: the body, eyes, ears, mouth, and the nose. The heart is the relation of perception that picks out joy, reason, and hate, among others, not unlike eyes and ears, can identify their own discriminant category of object properties. In fact, as Blake contends, for Chinese thought anything that can be known can be perceived. That is, unless the organizer of the senses—the heart—deems otherwise. As

Blake writes, “though the eyes may desire them, if the heart does not approve, they will not see the five colors” (p. 36). What the eyes do see, they see in terms of “heart” categories: a strong horse, a flavorful stew, a cold morning. The heart, then, “totalizes” the individual sensory percepts so that if one thing is perceived in becomes intertwined with all others. As Blake states, “to sense the shared property in one part or instance is to sense something about the totality” (p. 38). Without claiming any influence (in either direction), it is interesting to notice the ancient to medieval debates in the West on the role of the heart in perception, namely as the alternative to the brain as the “seat” of the unifying perceptual center of the common sense (on this, see Silva 2012: 171–176).

Blake’s emphasis on the structural aspects of Chinese thought shows, again, the importance of every idea encompassing all others. But perception can all go wrong if the organizing heart is disordered, whether it misjudges the name of a relation or fails to distinguish which relation is subsumed under which category. For example, “Suppose a person seeks an ox calling it a ‘horse’ or seeks a horse calling it an ‘ox.’ He certainly will never find what he seeks” (Lü 2010: 408; see Blake, p. 44). As Blake goes on to explain, this miscategorization may be due to mislearned names, misperception, or a more significant problem of an inability to discriminate the worthy from the unworthy. This appears to be a setup for radical skepticism, but, as Blake writes, “they do not seem to worry that the world is wholly unlike all of us perceive it to be” (p. 45). What seems to matter is whether the ruling class has an ordered heart among its other sensory organs, revealing, “the ways in which our assessments are tied to the ordinary contexts in which they are made” (p. 45), a cue to the above quote from Master Xun. In other words, though Chinese thought engaged with problems of concept application which may have led to the more pernicious theoretical concern of perception being concept-laden and thereby mediated by thought, the normative and practical concerns were greater and take precedent. It is worse to have a disordered ruler than a poor theory for a disordered heart.

Indian philosophy bears a similar concern as Chinese philosophy, with similar agrarian examples to boot. However, in Stephen Phillips paper, “Perception in Nyāya,” he writes in a manner that finds significant overlap with Western thought, including a familiar diagnosis that what distinguishes knowledge from opinion is some form of justification, of which perception is one kind. “Perception founds true beliefs, and the repeatable predicates and concepts (‘cowhood’) perceptually acquired pick out constituents of real objects, things that themselves reoccur” (Phillips, p. 52). But what of misapplication, when perception is not a justifying condition for knowledge? Consider the silver/shiny illusion:

“This is silver” in the face of shell has split intentionality, to wit, to a “this” in front but also to silverhood as instanced in real pieces of silver, whereas “This is silver” in the face of real silver has a unified intentionality, something in front that really houses silverhood.

(Phillips, p. 52–3)

Indian philosophy, like Western discourses, finds error theories to correct faulty perception with reason. The fault usually occurs in reaching for the wrong memory, which get fused to the perception-like event. Yet, after a few occurrences, it will become known that while shells appear silver-like they do not contain silver, and perception-events will draw from non-silver memories of shell perception, providing a reliable source of “silver” knowledge once again.

One wonders of the thorough-going realism of both Indian and Chinese philosophies, one that even its greatest expositors admit as being naive to the perplexities and hostilities of a global and diverse canon of arguments and examples, including new discoveries in the cognitive sciences that read more as Asimov fiction than reality. We will never know unless such a canon exists, making its availability through translation and research a priority to its assessment. What matters here is that a global philosophical canon is available for consideration in the first place, and this volume represents a step in that direction.

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1

CHINESE THEORIES OF PERCEPTION AND THE STRUCTURAL APPROACH TO COMPREHENSION

Jana S. Rošker

The present paper deals with the specifically Chinese views on human perception and its relation to comprehension in the sense of grasping the perceived objects, actions, or relations with the intellect. While perception refers to the receiving and processing of the sensory input into the low-level information, comprehension is here meant as the stage or ability to order these inputs rationally and to transform the elements they include into a higher-level information and knowledge.

Before the impact of Western thought, which became increasingly strong after the eighteenth century, Chinese theories of perception were, in essence, structural or relational systems of ordering and apprehending reality. On such a view, the object of perception were relations, forming a relative fixed but dynamic structural network. In China, the structural approach to perception was already elaborated in ancient times. It was based upon a supposition that the (external) reality was patterned in accordance with underlying structural principles (*li* 理). The same applied to the basic structure of human mind, which was also seen as being ordered in accordance with such principles. Hence, the classical Chinese perception model has been developed as an abstract prototype conditioned by the supposition of an existing compatibility between the structures of the external world and those of the human mind. In sum, structural compatibility of the subject and the object of comprehension was the basic precondition of human perception. The structural link between human consciousness on the one side and the external reality on the other was provided by the aforementioned structural principle *li*, which was seen as a basic concept, forming patterns that constituted a dynamic and all-encompassing structure.

This basic setting influenced not only the entire theoretical system integrated in the specific framework of the Chinese intellectual history but also each individual part composing this system, as well as the relations between its constitutive parts. The same holds true for the fundamental paradigms of this framework, for its central thought patterns as well as its epistemological and interpretative methods. All this constitutes the elementary specific features, which underlie all classical and traditional Chinese theoretical discourses. Because they are rooted in a specific referential framework and include several specific categories that cannot be found in the

mainstreams of Western philosophy, we have first to clarify the question of whether such a theoretical model could be considered as a part of the academic discipline of philosophy at all.

The field of Chinese philosophy still represents a riddle to most Western intellectuals. The term “Chinese philosophy” as such is namely problematic. When sinologists refer to Chinese philosophy, they invariably confront the suitability of the term. In the most favorable cases, sinologists simply bow to the necessity of explaining the specific features of traditional Chinese thought—for example, its epistemological roots and methodology—to philosophers trained in Western thought and colleagues from other disciplines of the humanities. The interdisciplinary issue of definition is preconditioned by the apparent need to clarify certain concepts and categories that form the root of all Eastern Asian traditions.

In general, scholars trained in Western philosophy have limited access to or knowledge of the general theories and original philosophical aspects of Chinese thought. Many features of classical Chinese discourse strike them as obscure and unsystematic and therefore lacking in theoretical reliability. Because of this response, we must first answer the basic question of whether it is possible to place the main discourses of traditional Chinese thought in the general category of philosophy. This question seems more crucial than ever as efforts to obtain a cross-cultural understanding of reality have become essential in our interconnected and globalized world. It seems clear that any attempts to gain an insight into modes of comprehension without simultaneously considering the philosophical perspective of others would be both arrogant and naive.

It is not my intention to reinterpret Chinese tradition in the context of Western concepts, because philosophy as an academic discipline has arisen from the essential human need to philosophize about reality. This need or feature of human thought and sentiment is universal, similar, for example, to the human ability to generate language. Although the ability or potential to create language and thus linguistic communication is universal, each individual language and the grammatical structures by which it is defined are culturally conditioned. Thus, my use of the expression “Chinese philosophy” does not refer to a geographical dimension of this universal term but is rather an expression of the cultural conditionality that defines a certain form of philosophizing, or a certain system of philosophical thought, with a typical paradigmatic structure. As Carine Defoort explains (2001: 394), we are perfectly accustomed to using the terms “Continental” or “Anglo-Saxon” philosophy to denote different types or genres within the philosophical tradition. The problem with the term “Chinese” philosophy is more fundamental. The differences between philosophy as it was developed in the European and in the Chinese philosophical tradition respectively supersede mere dissimilarities in genre, style, or dispositions. If we try to summarize each of them as a special discourse, it becomes clear that they are rooted in completely different frameworks of reference.¹

Diminishing the richness and depth of Chinese thought to a weak version of Western philosophical conceptions, or even dismissing its main tenets because they are “different,” results in the loss of methods in the forefront of possible culture-wide assumptions and the loss of access to the conceptual and ideational assets created and developed in the Chinese tradition (Creller 2014: 196). These tenets could be useful for many purposes: for example, in resolving long-lasting philosophical difficulties within the Western tradition, or simply stimulating the imagination, which is necessary for any genuine philosophical inquiry. Nevertheless, this line of thought serves to emphasize the fact that the Chinese themes and forms of reasoning are sometimes “so fundamentally different from those of their Western counterparts that they offer a unique opportunity to question, in a critical and philosophical manner, the currently prevailing notion of “philosophy” itself (Defoort 2001: 403).

For centuries, Chinese philosophy, similar to other philosophies all over the world, has been the driving force for the creation of ideas and the shaping of knowledge that forms and develops human understanding, launches human curiosity, and inspires human creativity. Therefore, the acceptance of the fact that the Western theories of perception do not constitute the sole, universally valid epistemological discourse (something that was taken for granted by most Western theorists less than a century ago) is gradually becoming a generally recognized position among most contemporary cultures and intellectual communities. Hence, it has also become increasingly clear that Western theories represent only one of many different forms of historically transmitted social models for the perception and interpretation of reality. Therefore, in this field, polylogues between different forms of intellectual creativity are not only possible but also very important. If we consider the value and significance of different systems within the framework of contemporary global developments, then we must go on to consider what role modern and adequate reinterpretations of classical Chinese philosophy—and classical Chinese theories of perception—can play in this lively process.

The concept *li* as structure or structural pattern

Against this background, it is easier to understand the specifically Chinese model of human perception, which was based on mutual compatibility between the structures of external and internal worlds respectively (Rošker 2008: 305 ff.). This pattern-based compatibility has always been seen as the fundamental (pre)condition of human perception. As already mentioned, the underlying basic principles that connected these two worlds were determined by the concept *li*, which constituted a structural principle of dynamic patterns composing a coherent and integral structure.² Thus, this notion has functioned as the traditional Chinese concept of structure. The speculative bases of such a structural system of perception were evolved already in ancient times.

In Western sinology, it may seem a bit unusual to interpret the notion *li* as a “structure.” However, there are numerous good motives for doing so. Although the term *li* was usually translated as a rational principle or idea, such translations were products of misunderstandings that were imbedded in the incomplete understanding of the problems of intercultural incommensurability.³ These cultural misunderstandings began in the seventeenth century, i.e. at a time when Christian missionaries in China were first confronted with the neo-Confucian philosophy. The neo-Confucian discourse was rooted in a bipolar perception of the world. The missionaries clearly saw that for the neo-Confucian scholars, reality was constituted from something, which was called *qi* 氣, and ordered in accord with something called *li*. Due to their Cartesian worldview, it was perfectly natural to the missionary theoreticians to see matter in the previous notion and idea in the latter. They could and did not understand that *li* could not be seen as principle or idea in a “Western” sense but rather represents a structural pattern, a network of structural relations, or a coherent all-encompassing structure, which can belong to both: the realm of ideas or abstractions, and the material world.⁴ It manifests itself as a notion of structure, of a structural pattern and the structural order of things respectively.

This connotation is already visible in the earliest etymology of the character *li*, which is composed of the phonetic element 里 and the radical 玉, which means jade. In the earliest written sources, *li* denoted the colored stripes or lines in jade (Bauer 2000: 256–257). Its re-emergence in the Song Dynasty (960–1279) as one of the central concepts of neo-Confucianism was the culmination of a long development (Graham 1978: 191–192). In ancient times, *li* has been understood as a visual structure, as it becomes visible in the course of lines in jade. In his book *Xunzi*, 荀子, the Confucian Xun Kuang, 荀況 (c. 310–c. 235 BC) defined it in a following way: “Form, color and structure can

be distinguished with eyes” (Chinese Text Project [CTP] 2016: Xunzi, Zhengming, 9).⁵ A bit later it attracted attention, especially in the essay “Interpreting Laozi,” written by Han Feizi, 韓非 (c. 280–233 BC), who used it to express the specific configuration of properties in each kind of thing: “We call *li* that, which is long or short, square or round, hard or soft, heavy or light, white or black” (CTP 2016, Han Feizi, Jie Lao, IV/1).⁶ In a more general sense, *li* was understood as the vibrant organization of patterned fragments in a structured entirety, of things in an ordered cosmos. On the other hand, it also represents the structure of thought patterns in rational discourses.

At that time, the structure seems to be understood as something constructed by the unity of all empirically perceivable properties of any object (length, color, consistency, weight, form). In this context, it appeared reasonable that any kind of cultivation or treatment of objects necessarily had to follow its inherent structure. Hence, it is by no means coincidental that whenever the notion *li* occurred in verbal function, it denoted the process of ordering things or phenomena into a coherent structure.

In the progression of further advance and through several semantic expansions, the term has later obtained several different connotations. First, it appeared as an expression of the cosmic, then of the social structure. Later on, its semantic connotations also contained the structure of language and meaning and, at last, the structure of human mind and the relation between consciousness and reality, i.e. between the subject and the object of perception and comprehension.

All these different kinds of relations and structural patterns were later (especially from the Chinese middle age onwards) amalgamated into a single, most fundamental rational structure, which was distinguished by its universal compatibleness with countless different structural patterns: “The structure is one, but it is divided into many different (structures or structural patterns). All existing things are unified by one single structure, but on the other hand, each of us is composed of its own structure (or structural pattern)” (CTP 2016: Zhuzi yulei, Li qi shang, Taiji tiandi shang, 8).⁷

Such a view, which was based upon a fusion of individual, particular configurations into one single, universal and fundamental structural network, was preconditioned by the long-lasting process of semantic abstraction of the term *li*. This development lasted several centuries and can only be understood in the broader context of various changes within Chinese society and culture. To a great extent, this process was influenced not only by changes in the political and economic system, but also by modifications in ideology. In this respect, the formalization of Confucianism in its role of the state doctrine was doubtless quite significant. In later centuries, this abstraction of the notion *li* was further enhanced by new approaches, established in neo-Confucian philosophies, as well as by certain elements of Buddhist philosophy. This gradual process can be divided into the following three phases (Rošker 2012: 47):

- 1 the phase of ontologization (*li* as the cosmic structure or as the structure of nature and society);
- 2 the phase of structural semantic (*li* as the structure of language and meaning); and
- 3 the phase of epistemologization (*li* as the mutual compatible structure of external world and mind).

Because of space limitations, we shall here only focus upon the third phase, which is essential for the understanding of the Chinese theories of perception and their structural constitution.

Basic precondition of perception: the merging of internal and external structures

The earliest influential discourses regarding the problems of transmission and communication between the external and the internal world were shaped during the period of the Six Dynasties (222–589), especially by the members of the group Pure Conversations.⁸ In this context, we have to mention Ji Kang (221–262) who followed the presumption, according to which “human heart-mind is mutually congruent with the structure (or structural patterns)” (Ji Kang 1962: 225).⁹

Ji Kang has notably presumed that the inherent structural order of human mind was compatible with the structure of external world. This basic presumption is visible in his treatise *Music Has in It Neither Grief Nor Joy*, in which he claimed that sounds as such don’t contain any emotions, although by listening to sounds, we can feel grief, melancholy or pleasure.¹⁰ Numerous other scholars of that time have advocated the contrary opinion and contended that the sounds or the structure of music might latently contain feelings or emotions. The modern Confucian philosopher Tang Junyi (1909–1978) argued that the central issue in both arguments was the connection (or relation) of two structures or structured patterns (*li*), namely the one by which the external world was ordered and the one defining the human consciousness (Tang Junyi 1955: 66). Regardless of the opposition of their particular hypotheses, both the supporters as well as the antagonists of Ji Kang’s theory followed the assumption, according to which particular sequences or configurations of sounds (the tonal and rhythmical structures of music) could alert emotions in the process of perception. This could happen due to the compatibility of musical structures on the one side and the structures of emotions (as a part of human consciousness) on the other. Several famous later theoreticians, for instance Lu Jiuyuan (1139–1192), also followed the same supposition, stating that “Human mind is (organized in accordance with) a structure” (Lu Jiuyuan, cf. Xia Zhentao 1996: 157).¹¹

Most of the Confucian philosophers saw this structure (and the structural links between its various patterns) as permeated with moral and ethical values. Already, Cheng Hao (1032–1085), one of the pioneers of the neo-Confucian stream of thought, had strongly emphasized that without being virtuous a human being could not recognize their unity with heaven and with “ten thousand things” respectively (CTP 2016: Er Cheng cui yan, Lun dao pian, 7).¹² The structural nature of human virtue manifested itself in the harmony with humanness (*ren* 仁), which was seen as the highest principle of social ethics. Thus, the comprehension of heaven and of the structure of the universe respectively was essentially linked to the comprehension of human nature (*ren xing* 人性) and of the structural order of human society.

The famous neo-Confucian philosopher Zhu Xi (1130–1200) also emphasized the importance of a mutual compatibility between the structures of external and internal worlds, i.e. the possibility of a fusion of mind and reality as a basic precondition of perception. He explicitly claimed, “Mind is the guiding power, but its guidance is structured. There is no structure outside the mind, nor a mind outside the structure” (CTP 2016: Zhuzi yulei, Li Qi shang, Taiji tiandi shang, 7).¹³

During the rule of the Song (960–1279) and Ming (1368–1644) dynasties, that is, during the most extensive flourishing of the neo-Confucian discourses, the majority of Chinese scholars believed that objects were perceived by the human mind through their mutual structural connection. Hence, in the Chinese middle age, the idea of such a structural link represented a central epistemological method. In this period, the neo-Confucian scholars developed the concept of *liang zhi* 良知, which denoted an a-priori, original or innate knowledge, implying, *inter alia*, the criteria for distinguishing right and wrong or good and

evil. *Liang zhi* was also understood as a component of the inborn structure of the inherent mind. Through its patterns, this inborn structure was inherently compatible with the cosmic structural patterns of external reality. The notion of *liang zhi* was particularly intensely accentuated by the representatives of the neo-Confucian idealist philosophers, as for instance by the members of the School of Mind (*Xin xue* 心學). Their main proponent, Wang Shouren (1472–1529), wrote: “The inborn knowledge of my heart-mind is [compatible with] the so-called structure of nature” (Wang Shouren, 1933: 57).¹⁴

Most of the later traditional Chinese philosophers assumed this proposition and firmly believed in the existence of such a structural ordering of human mind. The pre-modern scholar Dai Zhen (1724–1777), one of the most influential epistemologists of the eighteenth century, who was proceeding from realism and who simultaneously represented one of the last relatively autochthonous Chinese scholars,¹⁵ wrote:

The physical appearances arise from nature and are thus compatible with it. What is surrounding us, are sounds, colors, scents and tastes. Everyone perceives sounds, colors, scents and tastes. That which makes this mutual congruency between outside and inside possible are the sensory organs, known as ears, eyes, nose and mouth.¹⁶

(Dai Zhen 2009: 157–158)

In Dai Zhen’s view, such structural correspondence is reproduced in both human sense organs as well as the human mind. This view is not based on any idea of holistic identity, which has usually been attributed to the classical Chinese cosmology, but rather on the idea of the existence of a structural linkage between the external reality and the human mind. In Dai Zhen’s view, this connection exists independently and separately from our consciousness.

The notion of structure in modern China: a revitalization of forgotten ideas

China’s defeat in the two opium wars (1840–1842) signaled the start of the loss of its imperial, as well as political, economic and cultural sovereignty. The so-called Treaty of Nanjing (1842), which was signed immediately after the conclusion of the wars, opened the doors of the ancient middle kingdom, which had been sealed until that time, to foreign capital. In regards to the confrontation by Western thought and ideologies, which by this time had made their way into China in the wake of Western capital, the Chinese intelligentsia initially found itself on the horns of a dilemma. On the one hand, it was striving for a renewed cultural and political independence and sovereignty for China. On the other, this effort to liberate itself from the yoke of foreign colonial powers implied the need for advanced and competitive technologies, which could only be acquired through the specific technical and scientific knowledge of those same powers. It was thus made brutally clear to them that the traditional system of values and thought could no longer serve as the ideal framework for a social system that was being forced to adapt to modern conditions. At the same time, the hated Western usurpers paradoxically also appeared as new liberators, and that same Western imperialism and culture which the Chinese intellectuals blamed for the sudden, overwhelming crisis in which China found itself also contained elements that could show the downtrodden Chinese people the way to new prosperity. At the threshold of the twentieth century, a stern debate among Chinese intellectuals arose from conflicting opinions on how best to assume Western thought without dropping the core of the Chinese ideational tradition and the cultural identity linked to it. In a certain scope, these tendencies were already visible in the nineteenth century.

In this regard, the ancient Chinese structural paradigm was no exception. Numerous Chinese scholars who lived and worked during the latter half of the nineteenth century had already begun to search for a renewed unity of the subject and object of perception and comprehension. In this context, we must recall Tan Sitong's (1865–1898) notion of circulation, *tong* 通. In Tan's view, such circulation preconditioned the fusion of "external" and "internal" reality. This dynamic link between the two realities has been defined by humanness (or inter-human mutuality), i.e. by the traditional Chinese virtue of *ren* 仁 (Tan Sitong 1958: 10). Here, also, we are encountering an elaboration of certain abovementioned neo-Confucian epistemological approaches that were based upon the belief in the existence of an ethically permeated structure of the universe. However, on the purely internal level, Tan's concept of circulation merely represented a (direct) physiological linkage between reception organs, nerves and the brain, the relational, ethically pervaded framework still preconditioned its functionality.

A similar notion of circulation or decantation (*liuxing* 流行) also underlay Feng Youlan's (1895–1990) unity of mechanical and axiological levels of perception, which he termed "the incorporation of the Way" (*daoti* 道體, Feng Youlan 1999: III, 599). Zhang Dainian (1909–2004) also overtly indicated that the relation between beings and actualities could not be seen as a one-dimensional linkage between superficial phenomena and a complex reality, which lay somewhere behind them. Zhang rather understood this linkage as a manifestation of an integral and dynamic circulation between them. He described this relation in traditional terms, "a relation of source and course," *yuanliu* 源流, comparable to the link between roots and branches of a tree (Zhang Dainian 1984).

Even the Marxist philosopher Feng Qi (1915–1995) understood the process of perception and comprehension as an interrelational network, connecting the things as such (or the nature of nature 天之日) into a transparent structural order of facts and possibilities (Feng Qi 1996: 49). This structural order of patterns contained mutual relations or links between individual facts (or possibilities), but it simultaneously also reflected principles incorporated in them. As a typical Chinese Marxist, Feng Qi tried to posit the concepts of the subject and the object of comprehension into a common dialectical relation. In this way, he hoped to surpass the limitations between customary ontology and epistemology.

A very important scholar who modernized the traditional Chinese structural theory of perception was Zhang Dongsun (1886–1973). He developed the theory of the so-called pluralist epistemology (*duoyuan renshi lun*, 多元認識論), which was rooted in classical Chinese structural theories but also strongly influenced by the philosophical ideas of Chan Buddhism. In many different ways, his system represents one of the first comprehensive syntheses of ancient Chinese and modern Western ideas. Zhang's pluralism was founded on an alteration of Kant's epistemology, in which Zhang designed his own system of so-called pan-structural cosmology. This cosmology was strongly influenced not only by the classical Chinese structural discourses but also by the Chan Buddhist philosophy upon which his own worldview was based. An important assumption of his theory of knowledge is the neo-realist view that there is no precise correspondence between external phenomena and our perception of them. Thus, similar to Kant, Zhang also states that people are unable to perceive phenomena as they actually are. In construing the fundamental structure of actuality, he also discussed scientific discoveries concerning the most basic structures of atoms, which surpass the resounding borderline between particles of matter on the one hand, and non-substantial electromagnetic waves on the other. In this context, Zhang's criticism of the notion of substance was very radical, for he denied the factual existence not merely of the tiniest units of matter but even of electromagnetic waves (Zhang Dongsun 1995: 168–169). Hence, for Zhang Dongsun, the finding of the theory of relativity was relevant only in terms of identifying structural regulations and not in terms of understanding any new substances in nature or the universe.

According to Zhang's theory, all existing entities are in a continuous progression of endless change, which represents an interminable, constant alteration of various structural networks, which determine the progression and decay of their essential qualities. Zhang claimed that the human mind is not able to recognize reality as such but can only perceive particular facets of these modifications. Yet this applies not only to the level of human perception and recognition, for in Zhang's theoretical framework the structured order of relations is all that actually exists in the universe.

Zhang furthermore argued that all these structures were void, for they had no substance, nor any real qualities. Hence, material existence is merely a kind of physical phenomenality, which can by no means be identified with material substance. For Zhang, the level of material being is determined merely by structural relations and by the physical laws that define its existence. Thus, "matter" is nothing but a universal conception covering an overall sphere of numerous different designs of physical properties. Hence, in his view, matter turns out to be nothing more than a range of theoretical-physics formulas. In such a view, matter does not exist: all that remains are physical laws. Analogously, mind is a concept that belongs to the overall category of life; it mainly includes psychological laws, which cannot be reduced to biological functions. All outward structures are reflected in our mind, which (re)establishes them in the procedure of shaping structural designs of perception and conception. Nevertheless, his model is not solipsistic because in his view the outer reality is by no means an exclusive creation of our own making (Zhang Dongsun 1995: 171). In Zhang's view, the relation between the exterior realm and our subjectivity is complementary, correlative, and interactive. His theory can hence be seen as a genuine upgrading and concretization of ancient Chinese perception theories that were based on the model of a dynamic and flexible structural compatibility between mind and external world.

Most of the modern Confucian scholars who worked on the modernization of the Chinese theories of perception, especially Xiong Shili (1885–1968), but to a certain degree also Feng Youlan (1895–1990) and Mou Zongsan (1909–1995), also remained faithful to the traditional complementary understanding of both abovementioned elements of comprehension. They reproduced this correlative model either by a revitalization of essence and function as a basic methodological pattern, (Xiong Shili 1992), or by developing a system of immanent metaphysics (Feng Youlan 1999) and by the concept of a "genuine," i.e. objective, subjectivity, respectively (Mou Zongsan 2003).¹⁷ They all have applied methodologies which were founded on incorporating traditional Chinese approaches into modern theoretical accounts of the twentieth century. In such frameworks, the process of perception is composed by interactions between the subject and the object of comprehension, which were no longer seen as mutually exclusive absolute entities but rather as two interactive, mutual supplemental poles of correlative relations, defining the multilayered nature of reality.

In this context, we have to evoke Zhang Dongsun's crucial assertion, according to which the mutual relation of these two opposites is not a direct connection. Between these two poles, there is a multifaceted middle, which does not belong to any of them but has rather been shaped through their mutual dynamic relations with various material and ideational or spiritual facets of existence. Hence, all that exists is a part of the everlasting change, which manifests itself in constant modification of their structural links. Since Zhang denied the notion of substance and its qualities, all these structures were empty, that is, without any substance. For him, all facets of material existence are only a physical appearance, which differs from the notion of material substance. Hence, reality can at the most be compared with structural relations and physical laws by which it is defined. The outer world is thus determined by the nonexistence of substance (*shiti* 實體); all that exists are structural relations (*jiagou guanxi* 架構關係), which represent the so-called "external order" (*tiaoli* 條理).

Such syntheses are doubtless strongly influenced by Chan Buddhist epistemology. The aforementioned notion of structure is also closely related with the Chan Buddhist concept of the all-encompassing causal relational network *yinyuan* 因緣. This network is very complex and at the same time unsubstantial; it consists of countless relations of codependency, fusing with and separating from each other in various different ways and on countless diverse levels. Zhang's theory reveals the universal emptiness, which can, however, by no means be seen as a kind of nothingness, for it is an existent form of insubstantiality, marked by the absence of any static, unchangeable nature or of any coherent, self-sufficient being.

Conclusion

In this view, relational links are all that exists in the universe. Reality is nothing but a network of well-designed structures. However, these structures are not meaningless. Hence, human beings have not been thrown into this world merely as the by-products of some external mandate. Human beings are much more than externally defined fragments in the assortment of the multicolored relations shaping our actuality. We inevitably possess the prospect (and even the responsibility) to shape and develop the reality in which we exist. Our individual minds enable us to build bridges and connections between the universal and specific components of the human spirit. Therefore, such bridges can bond ourselves with our natural and societal surroundings. The appreciation of this very prospect to form our world is, as indicated indirectly by traditional and contemporary Chinese perception theories, tightly connected to the relations of which we are a part.

As we have seen, the central theoretical keystones of such paradigms were created much earlier in the Chinese ideational history because the foundations of a structural model of perception and recognition of reality had already been established in ancient Chinese philosophy. This paradigmatic basis manifested itself in the concept *li*. Numerous important Chinese scholars have developed this concept further in later centuries. It often occurred as a crucial element of various thought patterns, as, for instance, a vital feature of the classical Chinese logic of binary analogies. The present chapter has also shown that the central binary category of the neo-Confucian stream of thought (i.e. the concept of structure and creativity, *li* and *qi*) has mostly been seen as a dualism of idea and matter by Euro-American sinologists. It also explained how and why such understandings were wrong, since they have disregarded the existence of classical, structurally determined Chinese theories of perception.

It was also shown in this chapter that in the Chinese intellectual history, the notion *li* was mostly understood as a concept of structure, as structural patterns or structural orders of reality. In its entirety, *li* represented a cosmic design, and its structural lines were understood as relations, outlining both the realm of ideas and the domain of phenomena. *Li* was not followed or confronted like a law: the human mind went either with or against the grain of it, as if splitting firewood.

In the framework of classical Chinese theories of perception, such a structural network was composed of mutually complementary patterns. This compatibility was seen as the basic condition for our perception and comprehension of the external world. The all-encompassing nature of *li* means that the cosmos is structurally ordered. This structural order is compatible with the structural order of our mind and its connections with our sense organs. Our cognition can also proceed along the same structural order, for it is also reflected in our mind as reason.

Such interpretation of the Chinese term *li* in the sense of an elementary structural configuration, which makes human perception possible, is also fascinating in the light of comparable theories of perception. During the latter half of the twentieth century, structuralism has become a prominent theoretical stream of thought in European discourse. This applies for both humanities as well as natural and social sciences. It embodies a multifarious model, consisting of a wide assortment of various methods and programs, offering us new ways of understanding perception and interpreting our world: in this model, patterns of relations become the fundamental paradigm of reality. Most of these Western structural theories are dealing with relational methods of perception, comprehension and interpretation of reality. In such models, no entity can appear in complete isolation from the others. Hence, they can only exist as parts of structures, which associate them with other objects or entities.

This chapter also elaborated upon several problems related to human perception, such as the relation between the subject and object of comprehension, or regarding the relation between perception, comprehension and interpretation of reality in the process of interpersonal transmission. The Western theoretical creations of the twentieth century have produced many elements which, founded particularly on innovative, elementary theoretical approaches to the philosophy of language, resulted in several important intellectual shifts in the humanities, as well as in the cultural and social sciences. However, in spite of such important results, the Euro-American theories have yet to produce an integral and coherent structural model for perception.¹⁸ Hence, contrasting comparisons of Chinese and Western theoretical discourses, etymological analyses, and semantic studies of the traditional Chinese concept of structure can offer us new insights into the nature of human perception and reality.

Notes

- 1 Different cultures produce different referential frameworks, which are, on the other hand, linked to different methodologies applied in the process of perceiving, understanding and interpreting reality. Here, I am specifically referring to frameworks of reference that define theories and other forms of abstractly ordered cognitive constructions within sciences and humanities. A referential framework in this sense can be defined as a relational structure of concepts, categories, terms, and ideas, as well as values, which are applied in the cognitive processing of the objects of comprehension. It also includes paradigms and perspectives that influence and define the comprehension and evaluation of particular semantic elements within this structure, as well as the structure as a whole.
- 2 Due to its dynamic nature, Chinese philosophy is a process philosophy. It is a discourse, which is based upon the concept of immanent transcendence. This means that every notion can appear in both the transcendent as well as the immanent realm. The well-known notion of Dao (or the Way), for instance, is a category denoting the ultimate principle that creates all that exists, but, simultaneously, it is a part of this creation. Similarly, the principle *li* is a dynamic notion that refers to the overall general structure or order of the universe. This general structure, however, is of dynamic nature and hence changeable. It is moreover composed of innumerable structural patterns, which are compatible with the inherent structure of every concrete phenomenon. Hence the notion *li* can only be understood as a term pertaining to the concept of *becoming*, rather than *being* in the sense of an isolated entity. Therefore, *li* is a principle that unites in itself universality as well as particularity.
- 3 In this context, the term refers to the inability of transferring certain theoretical concepts from one cultural tradition (or from one sociocultural context) into the other.
- 4 On a basis of a more profound knowledge of the neo-Confucian philosophy, we can also easily see that the concept *qi* can hardly be understood as matter in the “Western” sense. The neo-Confucian philosophers have namely defined it as something which is not necessarily substantial for it composes even air or vacuum (the Great Void 太虛). Thus, it represents a concept that could be more appropriately named as creativeness or as the potential that functions in a creative way (Graham 1992: 61).
- 5 形體色理以目異.

- 6 短長, 方圓, 堅脆, 輕重, 白黑之謂理。
- 7 『理一分殊。』合天地萬物而言只是「一簡理」及在人則又各自有「一簡理」。
- 8 清談
- 9 心與理相順
- 10 聲無哀樂論
- 11 心即理也
- 12 This is the traditional Chinese metaphor for all that exists.
- 13 心固是主宰底意然所謂主宰者即是理也。不是心外別有簡理。理外別有簡心。
- 14 吾心之良知即所謂天理。
- 15 Here, the phrase “relatively autochthonous” refers to Chinese philosophy, which came into being before the influence of European and American thought. As Buddhist thought has been integrated into Chinese philosophy almost one and half centuries before that, its implicit and explicit influences can be regarded as part of traditional Chinese thought.
- 16 人物受形於天地故恒與之相通。盈天地之間有聲也。有色也。有臭也。有味也。舉聲色臭味則於天地間者無或遺矣。外內相通其開竅也。是為耳目鼻口。
- 17 *Tiyong* 體用 (substance and function) belong to the most important traditional Chinese binary categories. The so-called binary categories (*duili fanchou* 對立範疇)—e.g., *yinyang* 陰陽 (sunny and shady), *benmo* 本末 (root and branch), *mingshi* 名實 (names or concepts and actualities), etc.—represented the bipolar opposition model that is inherent in every existing entity, and simultaneously the mode of reasoning of these entities. However, in contrast to the Cartesian model of dualism, the opposition of the two anti-poles in the binary categories model is not a contradiction, for neither of the two poles exclude but complement each other in a dynamic, mutually dependent correlation. Hence, their interactive mutual relation is defined by the so-called principle of complementarity.
- 18 For a detailed elaboration on this problem from a comparative perspective, see Rošker (2015).

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2

PERCEPTION AND ITS DISORDERS IN EARLY CHINA

Susan Blake

This paper discusses theories of perception shared among familiar texts primarily from the warring-states period in China as well as explicit descriptions of perception, aiming to illuminate problems with perception. I use the terms “perception,” “perceiving,” and “sensing” in a nontechnical way to describe the characteristic activity of the eyes, ears, and other sense organs—how they allow us to learn about the world. I first briefly introduce the theoretical framework in which perception and knowledge are described, then discuss what can be perceived on these theories. My contribution here is a presentation of evidence of the largely unsubstantiated claim made elsewhere in the secondary literature that the functions of the sense organs and the heart—perception and cognition—are not conceived as substantially different. Second, I turn to a discussion of perceptual error, its sources and manifestations. To this discussion, I contribute a description of the texts’ recognition that substantial, if not total, perceptual error is possible.

First, a caveat is in order. Neither perception nor mental states in general are characterized by their possession of mental content; there is no explicit attribution of contentful mental states, with a handful of possible exceptions.¹ Knowledge and perception seem to be fully described in their characterization as actions that discriminate properties and objects. Hence, I focus my investigation on *what* we can perceive—the objects, rather than the contents, of perception. This requires a description of not only what objects and properties are “out there” in the world, but also which of these can be perceived. I examine the claim that nothing is in principle unobservable, finding evidence to support the idea that what can be known can in principle be perceived, with one possible exception.

Here, I focus on texts primarily from the pre-Qin period ending in 221 BC. Because I aim for this discussion to be representative of thinking about perception during the period, I examine texts from what later come to be identified as different schools of thought, particularly Confucianism, Mohism, Daoism, and legalism, as well as syncretic or miscellaneous texts. These texts contain a diverse set of ideas about the world and a person’s place in it, as well as about the kinds of things that can be perceived. However, they share a set of common assumptions about the objects of perception and its everyday operations, though some diverge in their conception of the limitations of perception or the abilities of the cultivated person.

During this period, there is little extended discussion of the workings of perception. The texts that say most about perception in this period are the *Mozi* 墨子, the core Mohist text, the *Xunzi* 荀子, an important Confucian text, and *The Annals of Lü Buwei* 呂氏春秋 (hereafter, *Annals*), a syncretic text. (Full bibliographical references to these texts are found in the “References” section at the end of the paper.) In addition, the legalist text *Guanzi* 管子 has several chapters that explore the workings of the heart, particularly the “Neiye” 內業 chapter. Legalist texts like *Guanzi* are heavily influenced (at least in parts) by broadly Daoist ideas, particularly nonaction and correspondence to the natural order. These texts, like the *Annals*, provide advice on government informed by reflection on the natural order and man’s nature, including the structure of perception. However, the *Annals* also exposit Xunzian themes like rectification of names and thus incorporates Confucian thinking on perception and knowledge. These texts are all pre-Qin, but I also examine a particularly rich later text, the syncretic *Huainanzi* 淮南子, from 139 BC, as this text is more explicit in stating the ideas in play in the earlier texts. In these texts, I examine the descriptions of the sense organs, what they take as their objects, and how they function such that they can be mistaken about their objects.

What we perceive

While humans play a distinctive role in the world, sometimes conceived as the inheritors and administrators of the political and ethical order decreed by heaven and to a lesser extent by ancestral gods, we are not distinctive in the sense of being made of different stuff.² When death comes, the body and *po* 魄 soul return to the earth, and the *hun* 魂 soul and the *qi* 氣 return to the sky (Munro 1969: 50).³ The heart, the seat of thinking as well as feeling, is not a non-physical entity but another organ like the eyes and ears, having particular functions; and the sense organs are the same in kind as the objects of sensation. The accounts of knowledge and perception do not depend on ideas about abstract objects or propositional content, instead describing categorizing and discriminating as the work of the heart and the senses.

The early Chinese conception of knowledge seems to have been one that emphasized or prioritized the ability to distinguish things from one another. An important passage from the *Mozi* allows that while blind people may be able to say something correct about what white is and what black is, they would not be able to distinguish black from white things if they were mixed together (47/23–24).⁴ Hence, Mozi says, the blind do not really know white and black—since though they know the name they cannot pick them out. As this passage suggests, knowledge in early China is generally taken to depend on the ability to group things that are of a kind. This ability itself depends on having an object that serves as the standard for the kind, and other objects are determined to be members of the class because of similarity with the standard (Mohist *Canons* and *Explanations* [hereafter *Canons*] A70, 65/40/8, 69/42/27). For example, a disk can serve as the standard for being a circle, and the sage kings serve as standards for human behavior.⁵

Knowledge is described as an ability and not as a set of inner representations.⁶ Attributions of knowledge are often simply ascriptions of “familiarity with things” (Harbsmeier 1993: 18)—as we describe knowing a person or place in English. The Mohist *Canons* describe knowledge as being in “contact” (*jie* 接) with a thing, glossed as seeing it, *jian* 見. This kind of knowledge by contact is associated with the ability to describe something, perhaps by naming it, when one has passed by it (*Canons*, A5; 40/2, 42/3; Graham 2003: 266). Characterizing a thing by naming the classes it belongs to is one way of grouping it with other things. The *Xunzi*, too, seems to describe knowledge as properly attributing names to

things—correctly identifying a name as correctly applying to something when it does (or perhaps endorsing something when it is correct).⁷ When we perceive, we differentiate classes, which is one kind of knowledge; assigning a name to the categories we pick out is another kind of knowledge, often understood to be part of the work of the heart, as we will see in the following section.⁸

Perception and knowledge

There is no common term for the work that the sense organs do—no verb that means “sensing” in general—only descriptions of the activity of each sense organ, like seeing and hearing. However, the five familiar senses are often described together, though sometimes four or fewer are included.⁹ The sense organs are identified as the eye, the ear, the mouth, the nose, and the body or form, which allow us to sense a familiar array of properties, including colors, sounds, flavors, odors pleasant and vile, heat and cold, and bodily ease.¹⁰ Often, when it seems the text refers to the senses in general, the eyes and ears are used as metonyms¹¹—for example, “the desires of the eyes and ears” is a common phrase, though the logic of such passages seems also to include the desires of other sense organs as well.¹² Arguably, the same logic holds in other passages where the operation of the eyes and ears is described—perhaps the eyes and ears merit special mention in descriptions of knowledge because they allow us a comparatively wider purview than the other senses, though they do not seem to be different in kind. I focus on vision, since it is the most widely discussed.

In lists of the activities and objects of the senses, the senses are described as differentiating (*yi* 異) or discriminating (*bian* 辯 or 辨). For example, at the *Xunzi* lists the objects and properties differentiated by each sense organ. The eye differentiates “forms, colors, and patterns.” This list concludes with the heart, which differentiates “speech, reasons, happiness, anger, grief, joy, love, hate, and desire” (22/17–19; cf. *Xunzi* 2014: 238).¹³

The senses are also said to know,¹⁴ and clarity of perception and intelligence are described with the same term(s), *congming* 聰明, meaning sensitivity and brightness. Wisdom is described as far-sightedness (*Annals*, 11/5.1). The fact that the senses as well as the heart both know and distinguish suggests that thinking, *si* 思, and deliberating, *lü* 慮—the characteristic activities of the heart—are not categorically different kinds of activity from seeing, which is corroborated by the gloss on *lü* provided in the *Mohist Canons*, which describes it as “peering” (A4; 42/2–3; Graham 2003: 266). Brown and Bergeton similarly assert that inspecting, *cha* 察, etc. are “mental forms of perception” (2008: 643). Perhaps most importantly, in the *Mozi*, intelligence and intellectual capacities like knowledge, *zhi* 知, and wisdom *zhi* 智, are defined on the basis of sight, *jian* 見 and clarity of sight, *ming* 明 (*Canons* A3, A4, A5, A6; 40/1–2, 42/2–4; Graham 2003: 266).¹⁵ These facts suggest several hypotheses: that knowledge is a form of perception; that all knowledge is perception (and vice versa); or perhaps even that what we call “perception” simply is what is called knowledge, *zhi*, in these texts. In any case, the great similarity between cognition and perception, if not their identity, suggests that anything that can be known can also be perceived. I test this last hypothesis later in this section.

The activity of the sense organs includes not only what we would usually call perception but also differentiations of the value of things. These evaluations often include an assessment of how the object will affect the body—odors are not neutral, but some are pleasant and some noxious, and the body senses comfort and ease. Perhaps springing from the senses’ ability to differentiate what is pleasant or painful, the sense organs are also said to have desires, which are often said to be inborn and shared between humans. The eyes desire beautiful colors, for example.

The most common verbs for vision are *jian* and *shi* 視, which are both generally used to represent successful seeing. Grammatically, these usually take a noun as object. *Shi* can mean “to look” as well as “to see”, and it can be used to indicate that someone sees something as like something else. The phrases in Chinese are variations on “to see X as like Y,” where “to see” is usually *shi*, and “as like” can be *ru* 如, *ruo* 若, or *you* 猶, all common means of comparison.¹⁶ For example, a somewhat common phrase is “to see death as a return” (*shi si ru gui* 視死如歸), and the *Mencius* speaks of Shun seeing everyone in the empire turning to him as like grass and leaves.¹⁷ While we may be tempted to understand this usage as being in some way metaphorical, I think we must at the least construe such phrases as describing mental activity on the model of vision. Further, we might reasonably think that rather than construing vision as a kind of discernment and knowledge, we should see discernment as like vision—perhaps if one knows something very clearly one succeeds in seeing it, as suggested by the description of intelligence as visual and aural discernment. In any case, given the underlying theories about the function of the senses as categorizing and discriminating, it makes sense to understand such passages as stating that the person perceives a similarity between these things, though not one usually picked out, making it worthy of note.¹⁸

Like each of the senses, the heart has desires and a set of properties to which it responds, including moral properties.¹⁹ Just as the senses cannot take on each other’s functions (*Xunzi*, 12/61), so the heart should not take on the offices of the senses (*Guanzi*, 55.6; Guan 1998: 235). However, the heart is taken to be the organ that commands, organizes, and governs the senses, which are frequently described as officials, *guan* 官.²⁰ Like a ruler, it issues orders but does not take orders (*Xunzi* 21.9/44–47; *Xunzi* 2014: 229). As the commander of the senses, the heart plays a role in what we do and do not see: “If the heart does not command it, then white and black can be before us, but our eyes will not see them” (*Xunzi* 21/4–5; cf. *Xunzi* 2014: 224).²¹ Similarly, the *Annals* suggests a controlling role for the heart: though the eyes may desire them, if the heart does not approve they will not see the five colors (*Annals* 5/4.1).²² As we will see, this can lead to problems when the heart is not capable of commanding.

In addition, the *Xunzi* describes a special role that the heart must take in evaluating or corroborating knowledge from the senses,²³ though the passage is difficult to interpret because of the *hapax legomenon* “verifying knowledge” (*zheng zhi* 徵知).²⁴ This passage suggests that perceptual knowledge depends not only on the eyes and ears but also on the heart:

The heart has the faculty of verifying knowledge; having the faculty of verifying knowledge and following the ears, one can know sounds, following the eyes, one can know forms. However, verifying knowledge must wait on the heavenly officials to register their kinds, and then is possible. If the five officials register but do not know, or the heart selects but does not explain, then everyone will call this “not knowing.”

(22/19–21; cf. *Xunzi* 2014: 238)

A question this passage provokes is why *Xunzi* thought we needed a kind of knowledge in addition to the knowledge of the senses—perhaps it is required to explain how the senses could know but people could nevertheless say that the person does not, or perhaps to explain that the heart can know the registers or records of the senses and so evaluate them against each other, not unlike the “common sense” of the Western tradition.²⁵ In line with the latter suggestion, Geaney argues that an important function of the heart is to use the verifying knowledge of the heart to evaluate whether a person is trustworthy, according to whether

their speech and action match (Geaney 2002: 94–95, cf. pp. 71–80, 89–95). Because the eyes cannot perceive sound, and the ears cannot perceive colors and forms, another organ would be required to compare the two. Hence, she argues, speech and action are compared by the heart, in a way similar to comparing whether two halves of a tally match after having been broken apart.

However, we need not follow Geaney in understanding verifying knowledge as exclusively concerned with comparing information from different senses. We might instead interpret this faculty as able to select among what each sense registers, endorse some of it, and perhaps translate what is endorsed into explicit speech in the form of names or descriptions.²⁶ In any case, these accounts have in common the heart's ability to evaluate what the senses reveal, which is involved in the heart's ability to resolve cases of perceptual error, discussed in the final section.

The objects of the senses

In terms of the objects of the senses, I argue that, in the dominant early Chinese conception, there is nothing above or beyond the common run of things which in principle we cannot perceive—no states that are not in some way, by a sensitive enough observer, observable. Jane Geaney asserts a similar claim: “There is no sign of the view that sense discrimination must be transcended in favor of a super-sensible form of knowing” (2002: 13). One way to test this claim is by examining aspects of knowledge that are often, on the Western conception, thought to require cognitive abilities beyond perception: the detection of mental states and moral qualities of people and situations. I will do this in the following sections. In addition, I will examine what may be an early Chinese challenge to the idea that everything is in principle perceivable: that the Dao, in being formless, is beyond sight and our other perceptual faculties. Though sages may observe things that cannot be observed by everyone, I argue that in these texts, a shared assumption is that any properties we can know can be perceived—with the Dao being an important exception.

Just as the senses put us in contact with colors and smells, the senses reveal “inner states” and moral qualities. People—at least some people—can see worthiness, right and wrong, the Dao(s) of heaven, and principles or doctrines.²⁷ The challenge, both with regard to our ability to perceive intentions and moral qualities, will be to demonstrate that these claims about what we can perceive need not be read as metaphors but can be understood as descriptions of properties in the world that we discern with our eyes, by comparing them with other things of a similar sort.²⁸ Such a view confronts a problem similar to that with direct realism—it becomes easy to describe how we can see things as they are in the world, but how we can see things as they are not becomes strange.

Perceiving mental states and intentions

Many of these texts discuss the ability to perceive qualities of a person that we might want to describe as inner: intentions, moral character, and the qualities of one's heart. Though the heart is said to be deep (*Annals* 20/8.1), it seems that sight can sometimes plumb it. We can see a person's intentions and moral qualities of a person, sometimes explicitly stated to be manifest in his body, often in his face and eyes.²⁹ Some texts even attribute to animals the ability to see intentions, suggesting that this is not a highly sophisticated capacity; in the *Huainanzi*, a pheasant sees the intentions of a fox and so flies away (18.37, 755).

If, as Geaney suggests, verifying knowledge involves the comparison of a person's speech and actions, and if the faculties of the heart are perceptual faculties, this might explain how we can perceive a person's moral character. However, this explanation is not necessary in order to explain how we can perceive a person's intentions, as demonstrated by the following passage:

“Laying eyes upon him, you could see that the Way was present in him” ... The reason that, not having seen someone one can know his intentions, and on seeing him one can see his heart and intentions, is because one's heavenly tally matches. Sages' understanding each other—why should it wait on language?

(*Annals* 18.3.3)³⁰

We might feel pressed to regard this talk of seeing someone's intentions, in this passage and others, as merely shorthand for recognizing in some other way; perhaps, it might be said, we perceive certain features of the arrangement of their body or face but must infer their intentions from these. Indeed, some cases lend themselves to this interpretation. In a passage from the *Annals* (18/2.4) quoted by Brown and Bergeton (2008: 649), a sage reads the king's lips, sees the emotion on his face and the disposition of his body. From this, he knows the king's intention to attack another state. In this case, it may seem plausible to understand perception as not reaching fully to the intention but as allowing us to infer the “inner truth” behind “external signs” (Brown and Bergeton 2008: 652).

However, conceiving of the “inner” as a realm apart and mental states as categorically different from physical states suggests that such states are not properly objects of perception but are the sort of thing that cannot be perceived. I do not think we are forced to understand the text in this way, and there are reasons not to do so—in particular, the fact that the knowledge and function of the heart does not seem to be categorically different from that of the eyes, and that the heart is not supposed to have any special capacity to differentiate inner mental states as opposed to those that are manifested externally.

We can understand other passages as indicating that the signs that indicate the presence of the intention actually allow us to *see* that it is present—directly and in a way not mediated by inference. At *Annals* 20/8.4, such indicators, *zheng* 徵, are also discussed; here, masters observe certain indicators, like the forehead or lips of a horse, and thereby knew qualities of the horse like the strength of its joints—qualities not obviously standing in a relationship that would allow us to infer them from the indicators. Instead, I think we should understand this passage as suggesting that the relevant characteristics manifest themselves in different ways, and thus that we can perceive them in their various manifestations—that is, that “indicators” are parts or aspects of the thing or property being observed. Masters differ from novices in knowing to look for, and being able to discern, these indicators. At the least, the text does not commit us to understanding this as a relationship of inference, and doing so introduces substantial theoretical assumptions, akin to claiming that we merely see the facing surfaces of objects.

Another passage addresses how we can know about the past and future by examining the present uses the following metaphors: “Seeing the water frozen in a jar, one knows the coldness of the wider world ... [T]asting a morsel of meat, one knows the flavor of the whole pot” (*Annals* 15/8.1). This suggests that since there is a shared property or principle running through different instances, we can know one by knowing the other. Alternately, we may understand this as being due to part-whole relationships between objects—one knows the whole by knowing a part.³¹ In either case, there is something shared between instances, or between the part and the whole, and to sense the shared property in one part or instance is to sense something about the totality.

Another passage that discusses the ways in which we can know what is often hidden comes from a chapter in the *Annals* on inspecting the subtle, *wei* 微. This passage suggests that by examining the subtle, with sufficient concentration and cooperation, one can detect the beginnings of rebellions and insurrections. This passage compares such insight to the clarity of perception required to see the tip of an autumn hair, the paradigm of the miniscule (*Annals* 16/6.1). Such passages suggest that we do not depend on inference in such cases but rather on finely attuned perception.

Another way of talking about the relationship between what we see and what we thereby know is to talk about the relationship between our knowledge and what our eyes can discern. Knowledge is said to make our eyes sharper—not simply that we can discern more types of things, but that our sight is clearer or better, *ming*.³² This passage seems to support the reading of the previous two passages.

Thus, there are numerous reasons for thinking that when the texts say that we can see a person's intentions—or other mental states, for that matter—we should understand them as speaking not about a way of knowing in general but about perceiving through sight, as the intentions are manifested in physical alterations—though this understanding of what we can see through looking at the objects around us may differ from our own.

Perceiving moral qualities of a situation

Another domain in which we are said to be able to perceive qualities that are not always thought to be perceivable is in the realm of the moral. This topic has been most extensively examined with regard to Mencius' notion of moral development, which allows us to see moral features of the world that we previously could not. Mencius thinks that our heart has certain innate responses—feelings of deference, shame, and accepting and rejecting, for example (*Mencius* 2A6), just as our sense organs share preferences for certain flavors and sounds (*Mencius* 6A7). These feelings are responses prompted by the appropriate circumstances (e.g., *Mencius* 6A4), and as such seem to be a kind of perception that tracks morally relevant features of situations. With proper training, these feelings can be cultivated so as to extend them to occur in the full range of morally appropriate situations. Though the mechanism described is different, Xunzi too seems to advocate the training of moral responses.

This idea of moral perception arises in discussions of moral connoisseurship. While these discussions center around practical reason, they can tell us something about moral perception as well. Eric Hutton (2002) provides a description of moral connoisseurship in the *Mencius* that builds on R. Jay Wallace's account. Hutton describes this as a kind of moral connoisseurship in part because the sages, who established the Confucian moral standards, recognized what would be most pleasing to the heart. Further, Mencius provides an account on which the moral person not only perceives the relevant aspects of a situation that constitute reasons for action but also “simultaneously senses” the “overall conclusion to be drawn from them” (Hutton 2002: 167) about what is the proper action, all things considered. Hutton claims that these judgments are not inferential but perceptual, and I agree. While the *Mencius* describes a process by which we can employ analogical reasoning to “extend” our perception of moral qualities to situations in which we had not previously detected them, this does not imply that the detection of those qualities depends in each instance on an inference.

However, I disagree with Hutton's claim that we must understand Mencius as thinking that all moral judgments must be able to be supported with reasons. On Hutton's account, the difference between connoisseurship and the moral intuitionism of McDowell is whether the moral agent can provide reasons for his judgment; if so, he is a connoisseur, not a moral

intuitionist. But consider the following fact: in connoisseurship, the explanations which the agent can offer in support of the idea that an action is right or wrong seems to depend on other, moral, features which the agent has discriminated through perception or “intuition.” However, these other features would seem to already have a moral valence but would not themselves be further defensible by reasons.

For Mencius, we must be born with tendencies to have moral responses; abstract reasoning, Mencius thinks, is not sufficient to provide moral responses in new situations, as he argues in his discussions with Mohists (cf. 1A5). He does not suppose that we can explain why we should feel compassion for a suffering ox, though he does think we can explain why this feeling should lead us to concern for the people around us (1A7). That this seems true of Mencius’ account seems to favor understanding him as an intuitionist on Hutton’s description, since there are certain moral judgments that we cannot provide reasons to explain.

However, the ability to employ reason to “extend” our innate inclinations does not imply that reason is required in each perceptual experience, as Amit Chaturvedi (2012) concludes. To suggest that learning, even learning that depends on reasoning, implies that each instance of perceptual experience involves reasoning is, in the terminology of current philosophy and psychology, to beg the question against the cognitive penetrability of perception. We need not assume that because a perceptual identification must be learned, it is therefore not perceptual. Learning might have to do with coming to attend to certain features of a new situation or with recognizing similarities between situations. And, indeed, if my general comments on perception and similarity are correct, this is just what we must do.

There is, however, a further problem that arises for a connoisseurship account, in so far as it presupposes that we can come to detect different features of the world: it seems to endorse a kind of realist picture of the nature of moral properties. On such a picture, it is straightforward to explain how we could come to detect them. However, the connoisseurship account does not seem to explain how we can make errors.³³ This, in general, is the price of direct realism. An alternative account of error, which I present in the final section, characterizes it as arising from a comparison with the wrong objects, resulting in mistaken judgment.

At any rate, whether Mencius has a connoisseurship or intuitionist view of moral judgment, the agent simply sees morally relevant features of the situation—which is consistent with my account of perception, which does not preclude ampliative reasons being provided.

Perceiving the Dao

The dominant account expressed above, that all things are in principle perceivable, seems to admit of an important exception: the difficulty or impossibility of perceiving the Dao, expressed in Daoist and Daoist-influenced texts. The Dao, sometimes identified as the great natural principle that allows all things to be as they are, is said to have no form—perhaps because of its greatness, the fact that it is all-encompassing, or that it is an absence, all descriptions found in various texts. Since forms are what the eye sees, this suggests that the Dao cannot be seen.³⁴ In passages that discuss this problem, the Dao is usually also described as having no sound—and thus as not able to be heard, etc.

For example, *Zhuangzi* 莊子 describes the Dao as without form, able to be attained but not able to be seen (6/29).³⁵ The “Neiye” chapter of the *Guanzi* also suggests that the Dao cannot be perceived. “The Dao is what the mouth cannot speak, the eyes cannot look at, and the ears cannot listen to, but is that which can be used to reform the heart and rectify the form” (*Guanzi* 49.2; cf. Guan 1998: 42). A later text, the *Huainanzi*, also maintains that the Dao cannot be perceived because it is formless. “Though you look for it, you will never see

its form... / It is a formlessness from which forms are generated” (1.13; Liu 2010: 64). Such descriptions of the Dao abound in texts that seem to describe the Dao as a metaphysical entity, rather than as a set of practices as it is for the Confucians.³⁶

While some texts suggest that the sage can see the formless or hear that which is without sound, there is still a tension here.³⁷ This dependence on the spirit, evident in at least parts of the *Zhuangzi* like the passage above, seems to be further developed in later texts like the *Huainanzi* that move toward an understanding of the Dao and the person divorced from dominant norms and not tied to the body or social world.³⁸ The *Huainanzi* suggests that with the proper cultivation of the spirit(s) (*shen* 神) and *qi* 氣, a person will become more like spirits and *qi*; “penetrating and spiritlike, using vision, nothing is not seen, using hearing, nothing is not heard” (*Huainanzi* 7.3; Liu 2010: 243).

Another interpretation of passages that describe the Dao as formless is provided by Mark Csikszentmihalyi, who notes the *Hanfeizi* and *Xiang'er* commentaries on the *Dao De Jing* Chapter 14, which says that the Dao is “a form (*zhuang* 壯) without form, an image without object.” These commentaries seem to be making claims about the fact that “the entire Dao is not directly perceptible,” and that it is impossible to “perceive in its entirety” (Csikszentmihalyi 1999: 45–46). This sort of reading is consistent with the idea that one can perceive a whole thing by perceiving a part. In any case, I do not propose to solve this problem here. However, it seems that in this case the exception proves the rule—the extremity of the exception serves to indicate the wide range of cases in which the rule holds.

Problems of perception

Any description of how we perceive and know about things in the world must address perceptual error—how perception can fail to report truly. In discussions of epistemology and perception in the contemporary West, this area is vexed by the problem of explaining how we might describe perception, which must be causal in order to connect us to the world, as nevertheless possessing intentional features. Chris Fraser argues that the early Chinese tradition is relatively immune to a certain kind of skepticism—a skepticism about the existence or characteristics of the world around us, which in the West is inspired by concerns that our senses may systematically deceive us. Because early Chinese thinkers do not have a representational theory of knowledge and mind, he argues, they are not tempted by the existence of perceptual error to conclude that all might be illusion (Fraser 2011: 129–131). No focus on perceptual error drives us to the concern that all perception might be in error, nor therefore to the conclusion that what we perceive are not objects in the world but rather sense data, nor therefore to a difficulty demonstrating that the world is at all as we perceive it to be.³⁹ Perception in the Chinese tradition seems to avoid this difficulty by describing perception as the ability to discriminate or differentiate things from each other. After all, on this model of knowledge, our understanding of errors in perceptual identifications depends on our understanding of how we make those identifications at all; since Chinese theories depend on comparison between objects, the objects and properties we pick out, even when we make errors, are nevertheless thought to be objects and properties that exist in the world. What it is to be a kind of object apparently is just conceived as bearing certain similarities to other things we identify as such.⁴⁰ Even if we pick out incorrect characteristics to serve as the basis for comparison, we’re still dealing with actual properties of things in the world.⁴¹

Arguably, then, certain kinds of massive errors about perception, of the kind that lead to external-world skepticism, are precluded (or at least forestalled) by this account. Fraser claims that early Chinese skepticism “takes the form of questioning whether our system of norms for discriminating and responding to things ... is correct or appropriate” (2011: 145) and

whether our ways of carving the world, through language and standards, can guide us reliably and consistently. We can question the categorizations we make on the basis of their effects, arguing as the *Zhuangzi* does that no set of categorizations is validated by all sets of purposes.

As we might expect from a tradition that conceives of the perceptual organs and their objects as of a kind, physical things often interfere with perception. When one goes too long without food, one loses the abilities of one's eyes and ears.⁴² More to the point, because the eyes, ears, and heart are things that interact with things, they can be “drawn” *yin* 引 by them (*Mencius* 6A15; *Xunzi* 21/57, *Xunzi* 2014: 231), which presumably indicates not only distraction but the possibility of error. However, both Mencius and Xunzi give the heart a special function that allow it to resist the “pull” of things; for Mencius, this is thinking *si*. Xunzi provides a more detailed description.

In these texts, perceptual errors are threatening for practical reasons—because they culminate in failures of political order due to people's inability to understand what the ruler commands. While, as Fraser argues, these texts do not exhibit external-world skepticism nor perhaps its precursors, there is nevertheless the potential for substantial problems with perception of basic features of the world—a problem with ramifications for understanding others and for our systems of classification. The texts countenance the possibility for massive error of certain sorts—confusing darkness for light, or disorder for peace. Though these errors are not explicitly described in terms of perception, since the conception of judgment as discrimination or differentiation is common to perceptual judgments as well, it is possible that these errors occur in perception. The *Xunzi* details perceptual errors:

Whenever one's observation of things is doubtful, if on the inside one's heart is not settled, then external things will not be clear. When I deliberate about something unclear, then I cannot determine what is the case and what is not the case. A person who walks in the dark sees a stone lying on the ground and mistakes it for a tiger lying in wait ... This is because the darkness obscures his clarity of vision. A drunkard tries to leap over a gorge a hundred paces wide, mistaking it for a ditch a half step across ... This is because the wine has disordered his spirit. If you press on your eyes and look, you will see one thing as two ... This is because the conditions have disordered your senses. Thus, to people looking down on cows from on top of a mountain, they will look like sheep, but those seeking their sheep do not go down to lead them away, because [they understand that] the distance has obscured their true size...

(21/67–72, *Xunzi* 2014: 232–233)

Here, Xunzi allows that external conditions can cause someone to see things as they are not; circumstances such as darkness or drink, or abnormal conditions like pressure on the eyes, can cause us to take what we see to be other than it is. In these cases, the conditions “obscure our clarity of vision” or “disorder” our spirit or our sense organs. This is a larger theme of the chapter—the ways in which conditions, external or internal, can cause us to fall into error—and sometimes a gorge. However, the final part of the passage emphasizes that even if the conditions are not favorable, we may still judge rightly—if “the heart is stable”, we can still determine what is the case and what is not the case and so do not make errors like thinking that faraway oxen are sheep.

Geaney interprets error in texts like this one apparently on the model of attention—one makes an error because one is attending to the wrong thing; errors are due to an “obstruction of direction” of normal sensing (2002: 44). Fraser interprets error as being due to mistaking a

part for the whole—the person responds to part of the circumstances or object, thinking it was the whole. Had she recognized that it was merely a part, she might have avoided the error. Fraser argues that Xunzi, like the Mohists, specifically understands perceptual errors as arising from failing to consider all relevant information.

Fraser takes Xunzi to think that the corrective ability of the heart to be sufficient to erase the possibility of systematic illusion, so long as we “employ [our] capacities properly” (2011: 139), utilizing a stable heart to check what the senses register. Because the operations of the senses can be regulated by the heart, Fraser says, so long as “agents do attend to the overall circumstances, employing a ‘stable’ heart and ‘clear’ thinking, they will recognize that the similarity is insufficient and will avoid error. Illusion thus provides grounds for concluding that perception is reliable, not unreliable, provided the heart is employed properly” (Fraser 2011: 144).

Problems arise, however, when the heart is not stable, and I argue that these can lead to substantial error, if not external-world skepticism. In addition, error can arise from disordered names, which throw our ability to discriminate into chaos.⁴³

Disorders of the heart

A problem lies in the fact that in the *Xunzi* the heart is supposed to evaluate the senses but can itself fall into disorder. Particularly, the mind can be preoccupied by doctrines such that it interprets the world in light of the doctrine, even when that leads to error. In cases of illusion, if “one’s heart is not settled, then external things will not be clear” (21/67–68)—but in cases where the heart is preoccupied by doctrines, it will be unable to play its role correctly, this can (and in the texts, sometimes does) lead to gross and thoroughgoing misrepresentation of the world.⁴⁴

Let me say more about this. As we saw above, in the *Xunzi*, the heart may be a necessary actor in perception, but, like the senses, its judgments can be disordered by emotion or circumstance. Through fear, desire, or obsession, the senses can be disordered, and if the heart is not inwardly settled, the errors arising from our sense organs can fail to be resolved correctly. In the cases of the senses being disordered, the heart could detect their disorder and correct for it. But in the case of the disorder of the heart, the heart cannot do even that. The *Annals* says, “The tragedy for those who are confused is that they do not take themselves to be confused, so in the midst of deep confusion they [think] there is understanding, and in deep darkness [they think] there is illumination” (18/4.1).⁴⁵ (Note that both of these play on light and the mind’s abilities.)

These emotions, then, may prevent us from being aware of the most immediate characteristics of our circumstances—we may not taste the meat we eat or hear the sounds of bells.⁴⁶ If the heart is obsessed, we may not see black and white.⁴⁷ “If it is drawn aside by even a little thing, then on the outside one’s correctness will be altered, and on the inside one’s heart will deviate, and then will be incapable of discerning the multifarious patterns of things” (21/57, Xunzi 2014: 231). The disorder of the mind can lead us to be incompetent with regard to even the most basic characteristics of the things around us. We can be literally blinded by the disorders of our mind, and everyone is subject to such disorders.⁴⁸ The possibility of this kind of misperception arises in many texts. In some, it is only partial, but in others it is more comprehensive. In the *Analects*, we see Confucius getting carried away by listening to music, so transported that he does not taste the savor of meat for three months (7.14). This seems to be even more a problem for those who lose their natural responses, which even Mencius countenances as a possibility (6A8).

Further, the *Zhuangzi*, in challenging the idea that the body has one “true ruler” (2/15, 27), the heart, and suggesting that everyone’s heart will provide them with different promptings, gives us further reason to suspect that following the heart will not lead us to the same conclusions. Endorsing and rejecting, and other responses of the heart and the self, seem to spring up spontaneously out of nowhere, and they seem to differ across people. Hence, the text suggests, it is wrong to claim that we can rely on the heart—even if it is in an ideally unobscured state—to indicate what is actually so.

Disorders of names

A second major problem for perception arises in the fact that people’s hearts are disordered by the fact that names are disordered. This problem is confronted explicitly by Xunzi, who makes it a priority to “rectify names”, since having correct names for things ensures that the correct objects are distinguished, and the kings’ intentions are understood (22/6–13; cf. Xunzi 2014: 236). Though Xunzi is primarily concerned about political order, the cause of disorder is our topic here—the fact that names do not seem to discriminate or pick out objects systematically: “If names and their corresponding objects are tied together in a confused fashion, then the distinction between noble and base will not be clear, and the like and the unlike will not be differentiated” (22/13, Xunzi 2014: 237). If disordered names can impede our making of differentiations, this affects not only those differentiations made by the senses like colors or smells but also those made by the heart like moral qualities or social rank.

Ideally, an accepted name marks a grouping of relevantly similar things picked out by the senses or the heart. Xunzi thinks that a thing is called by the same name as other things—other members of its class—because of similarities we perceive: “Generally, for things of the same kind in the same condition, their heavenly officials’ discrimination of things will also be the same. So comparing the similarities and unclarities, one communicates with others. This is that which is used to make common their agreed names” (22/15–17; cf. Xunzi 2014: 238).

According to the account Xunzi gives of similarity and difference, we are aware from birth of many sets of similarities. We are not, however, aware from birth of the similarities that are relevant to our functioning well in the world—there does not seem to be an assumption (barring the objects of the desires of the senses) that we naturally pick out the same sets of things, and thus we may fix on incorrect or harmful similarities. A difficulty for our ability to detect sameness and difference arises because language is disordered and names are in need of rectification. Names, when used erroneously, cause people to miss the relevant similarities and to fasten on to irrelevant ones instead. Without the direction of a true king, people’s usage will diverge because of malicious intentions or simply lack of guidance. The person might, as Fraser suggests, indeed be picking out similarities in the world, but he might nevertheless be led into error by employing the wrong names and the wrong similarities. The *Annals* describes the extent of confusion that can result from disordered names:

Suppose a person seeks an ox calling it a “horse” or seeks a horse calling it an “ox.” He certainly will never find what he seeks ... Speaking of wisdom and mastery of a subject but being in fact stupid and careless; praising the eminent and worthy yet surrounding oneself with the mean and low ... these five modes of conduct are all instances of “considering an ox to be a horse” and “a horse to be an ox” because the names are not used correctly ... The expressions “What one thought was white turned out on second glance to be black” and “The more one seeks it, the less one finds it” surely have this meaning.

(17/1.4, Lü 2010: 408)⁴⁹

Here, too, it seems that substantial perceptual error can result. Note that for this kind of error—mistaking black for white—Fraser’s part-whole description does not provide an explanation, since there is no suggestion in these passages of a part having the opposite character from the whole for which it is confused. One can get at least some things substantially wrong, mistaking black for white or oxen for horses.

There seem to be two possible interpretations of problems associated with disordered names. One is that the terms “black” and “white” might be switched in a person’s vocabulary, so that when seeking something they call “black,” they select something white. This kind of error would be a mistake about the accepted names but perhaps not about the value or significance of what one was seeking. I think the texts are pointing to a more threatening problem, however. Presumably the ruler seeks worthy officials who are competent to help him rule but unknowingly chooses the opposite. His doing so indicates a lack of understanding of what it is to be worthy or unworthy, and this points to a more threatening possibility: that disordered names can cause us to lose our ability to tell such categories apart. This points to a real problem with discriminating the worthy from the unworthy or black from white.

Conclusion: radical perceptual error?

If perception and knowledge are in fact the same, as I argue above, then problems with the differentiations we make can affect all of our perceptions and therefore all of our knowledge. Even if a weaker hypothesis is true—that everything that can be known can be perceived—this would still suggest major problems for knowledge as well as perception. In the case of disordered naming, the potential errors might be limited to the categories associated with the disordered names; in the case of a disordered heart, it could extend more widely, affecting all of one’s moral perception and perhaps all of one’s perceptual judgments, and thereby perhaps all of one’s knowledge. These problems may be temporary, as with drink, or they may be long-lasting, as with doctrine. As Fraser notes, one who makes thoroughgoing errors about the world will not survive long. But this does not indicate the impossibility of such errors. These texts seem to countenance the possibility of such substantial error, even if they are more concerned about the political rather than the personal consequences of such error.⁵⁰

Whether confusion is due to desires or doctrines disordering the heart, or whether the confusion originates in disordered names, the texts seems to recognize the possibility of major error—of failing to distinguish same and different for a number of different categories—though they do not seem to worry that the world is wholly unlike all of us perceive it to be. The most pernicious worry seems to arise in connection with the perception and judgments of the ruler, whose misrule can cause chaos and suffering in the world. However, the very fact that we can make such assessments—that evil kings make systematic errors in their judgments—reveals the ways in which our assessments are tied to the ordinary contexts in which they are made.

Notes

1 See Harbsmeier (1993: 16–18).

2 See Schwartz (1985).

3 The *qi* is a kind of refined air that normally circulates through the body, as well as through the rest of the world, and makes perception possible.

4 For the reader’s convenience, where possible I refer to texts by standard numbering of passages that is shared between Chinese and English editions. This is possible for texts like the *Analects*, *Mencius*, and *Annals*. Elsewhere, as for the *Mozi*, the *Xunzi*, the *Zhuangzi*, and the *Huainanzi*, I provide the Harvard

- Yenching Index numbering. Where the translation is mine, I also refer the reader to other English translations using the Confer (cf.) notation.
- 5 It is not clear whether only particularly stereotypical members of a kind can serve as standards for the kind, or whether any member might. For example, if we take rectification of names to be about taking only good examples (like a good king) as a standard, then there is a tension concerning whether we should include bad examples (like tyrants) as members of the class.
 - 6 Cf. Fraser (2011: 131–137). Fraser suggests that the most common kind of knowledge in these early texts is “‘knowing-of’ or ‘knowing-about,’ a sort of recognition, familiarity, or understanding” (p. 131).
 - 7 Fraser (2011: 137); *Xunzi* 2/12.
 - 8 This is not an exhaustive list; at *Mozi* A80 (66/40/12, 69/42/36–37), other types are discussed.
 - 9 For example, *Xunzi* 4/44–45, 3.10/26. Cf. Geaney (2002: 16–17).
 - 10 The first three senses are commonly associated with a set of five sensible properties: five colors, five sounds, and five flavors.
 - 11 Geaney (2002: 63) considers the idea that the eyes and ears serve as synecdoche for all the senses, but ultimately rejects it, treating the eyes and ears as having a distinctive role.
 - 12 Cf. Geaney (2002: 50–52).
 - 13 *Xunzi* 2/40 and 4/44–45 refer to the work of the senses as discrimination, *bian*.
 - 14 Cf. Geaney (2002: 35–37) and *Mozi* 32/5–6. Further, sometimes the senses do not know, as at: “when the heart is fearful, eyes do not know colors” (*Xunzi* 22/84–85, cf. *Xunzi* 2014: 246); or Butcher Ding, who says “I don’t look with my eyes; the knowledge of the ‘officials’ stops and I let the desires of my spirit proceed” (*Zhuangzi* 3, 3/6).
 - 15 The difference here may be between the objects discerned not between one’s accuracy in representing them.
 - 16 We occasionally encounter descriptions of perception as mistaken, though often using verbs other than *shi*, such as at *Annals* 13.3.2. Several examples of perception being incorrect occur in a description of minor problems with perception at *Xunzi* 21/69–71, where the phrasing is *shi* X *yi wei* 以為 Y, or “to see X taking it to be Y.”
 - 17 See, e.g., *Annals* 12.2.2.
 - 18 In her chapter in this volume, Josefa Toribio explores contemporary theories of visual categorization, including some that resemble this one.
 - 19 For example, in the *Mencius* at 6A4 and elsewhere, the moral emotions are responses to external things and serve to indicate properties and proper responses, as our feeling of deference to an elderly man.
 - 20 For descriptions of the senses as officials, see, e.g., *Mencius* 6A15; *Guanzi* 12.7, 36.1 (and the commentary on 36.1 at 36.4), and particularly 26.1, which also describes the heart as employing or commanding, *shi*使, the officials, which include the four limbs; *Xunzi* 17.4 describes the heart as the prince, *jun* 君, that governs and sets right the officials. Even the *Zhuangzi* speaks in this way, cf. footnote 16.
 - 21 I take this to mean not that we don’t look but that if we did look, we wouldn’t see them. See *Xunzi* 22/80–81, *Xunzi* 2014: 246; *Analects* 7.14.
 - 22 Similarly, the *Annals* says that the senses, like a government office, are controlled or regulated by something else (2/2.1).
 - 23 Interestingly, the Mohist *Canons* B46 (66/41/4–5, 72/43/54–55) seem to suggest that the operations of the five sense organs are not sufficient for knowledge and that, more surprisingly, it is not the eye that sees. However, the reconstruction of this passage must still be regarded as speculative.
 - 24 Knoblock notes that other commentators have translated *zheng* 徵 as “summon”, “verify”, “test”, and “respond” (1994: 129–130). Elsewhere, it is most often used as a noun, often meaning “indicator” (see below), therefore it is of note that in *Zhuangzi* chapter 32, the spirit (*shen* 神) is said to *zheng* (32/50–51). This emphasis on the spirit is in keeping with a trend that is also seen in the *Huainanzi*—to privilege the spirit over the heart, perhaps because of the fact that the spirit is not tied to particular functions. This usage of *zheng* also appears in the *Heguanzi* 鶡冠子 “Xue wen” 學問 chapter.
 - 25 However, the faculty of verifying knowledge would be unlike the “common sense” in the Western tradition, since the question would seem to concern not the cause of the sensations, but the character of the thing evaluated. It is also unlike an “inner eye” with which we gaze upon our sensations.
 - 26 Cf. Fraser (2011: 138).
 - 27 Respectively, *Mencius* 1B7; *Huainanzi* 19.14, 785; *Dao De Jing* 47; and *Annals* 19/4.7 (cf. 19/7.1).
 - 28 After the introduction of Buddhism to China, a question arose among neo-Confucian scholars as to whether sensory knowing is necessary for, or inimical to, *de xing zhi zhi* 德性之知, virtuous nature’s knowing. Zhu Xi concludes the two are the same. See Angle and Tiwald (2017: 110–132). Thanks to Steve Angle for calling my attention to this.

- 29 See, e.g., *Mencius* 3A5.
- 30 Cf *Annals* 20/8.1.
- 31 I will discuss such a view in the final section, which has been one explanation offered for perceptual error.
- 32 *Annals* 24/2.2, 4/3.2; *Guanzi* 26.2.
- 33 Of course, the connoisseurship account is aimed at skillful discriminations, not those that are in error. But this presupposes that we can identify skillful action and judgment, which is a source of difficulty for moral accounts.
- 34 Cf. 22/17–19; cf. Xunzi (2014: 238).
- 35 Cf. *Zhuangzi* 22/56–57; and *Dao De Jing* 41.
- 36 A particularly funny description of the contradictions associated with seeing that which is without form is found at *Huainanzi* 16.1, which features wordplay based on ambiguities in the object of sight and hearing.
- 37 Cf. *Huainanzi* 2.8; p 95, 7.3; p 243; *Annals* 18/3.2; and *Annals* 18/2.4 for an example of cross-modal perception.
- 38 See footnote 21.
- 39 Fraser observes that the *Xunzi* “mentions nothing corresponding to sense impressions or sense data” (2011: 138).
- 40 Further, a concern about groupings that don’t capture salient features of the world—which might be inspired by the observation that everything is like every other thing in some way—doesn’t seem like a viable strategy for the Mohists, who explicitly rule out *kuang ju*, or “wild referring,” glossed as using the wrong characteristics of things to distinguish them from each other, and which is not able to be used to know the differences between things (*Canons* B66, 41/18, 43/70–72, cf. Graham 2003: 437).
- 41 The possibility of this problem is suggested by Mohist *Canons* A96 (66/40/19, 70/42/47–48), cf. Graham 2003: 345.
- 42 This is one of the reasons for the critique of funerary practices offered by the Mohists.
- 43 *Ming* 名, name, has the general meaning of “word.”
- 44 Note also that the mind is compared to a pan of water—the water is not able to reflect things if it is not still.
- 45 Also: “Those who think too highly of themselves do not reach the truth ... They confuse dark with light, disorder with stability, failure with success, and danger with tranquility” (13/5.1, K292). And: “When men are partial to a particular view, the necessary result is that they will deem dawn to be dusk, white to be black, and the sage Yao to be the tyrant Jie” (16/7.3, Lü 2010: 400).
- 46 “If one’s heart is worried and fearful, then even if one’s mouth is stuffed with grass-fed and grain-fed meats, one will not know their flavor ... Even if one’s eyes see beautifully embroidered emblems, one will not know their shape” (*Xunzi* 22/80–81, Xunzi 2014: 246).
- 47 “If the heart does not engage the senses, then even when black and white are in front of you, the eyes will not see them ... And moreso is this true of the one that engages!” (*Xunzi* 21/4–5).
- 48 Among the causes of fixation or mental obstruction are include desires and dislikes (21/6–7). “Each of the ten thousand things is different and so none cannot obsess us—this is a common peril for the operation of the heart” (21/7; cf. Xunzi 2014: 224). “Tang Yang was fixated on his desire for power” (*Xunzi* 21/16; Xunzi 2014: 226).
- 49 Cf. *Annals* 16/8.2.
- 50 While it may be that on some systems from this period, the world is knowable due to sharing structure with our thought—as discussed in Jana Rošker’s chapter from this volume—it can nevertheless fail to be known, it seems.

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3

PERCEPTION IN NYĀYA

Stephen Phillips

Classical Indian philosophy stretches from about 200 BCE to the modern period, that is, in the narrow sense of “philosophy,” not as “world view” or “strategy,” but in Sanskrit texts where authors self-consciously employ arguments in support of metaphysical, epistemological, psychological, and other positions. Theories of perception emerge tied to prior commitments in metaphysics in particular as well as to theories of knowledge that differ sharply among competing schools. Exceptions to this integration are skeptical positions that challenge epistemology or philosophy as a whole. But Nyāya views are no exception to the rule that different areas of Nyāya theory interlock (or should interlock, as is argued: lack of interlock, *apasiddhānta*, is looked upon as a fallacy). The school, which originates in the *Nyāya-sūtra* (c. 100 CE?) attributed to a legendary “Gautama,” advances a theory of perception within a commitment to a thorough-going realism—objects, including universals or class characters, exist independently of our subjectivities—and to a consonant externalism in epistemology that finds knowledge generated by causal processes crucially involving the objects perceived.

In the Nyāya view, the causal processes of knowledge generation known as perception (*pratyakṣa*) begin in contact or connection between an object and a bodily sense organ. In the views of certain other schools, perception is much more subjectivistically conceived, and Nyāya authors argue over centuries against a variety of idealist and internalist positions. Nyāya advances not only a causal understanding of perception but also of knowledge as well, all of which stands in sharp contrast, for example, with an elaborate phenomenalist theory developed in Yogācāra Buddhism. Century-spanning exchanges between Nyāya and Buddhist authors over the nature of perception considered both epistemologically and psychologically along with the nature of objects “directly” perceived comprise important strands in the overall course of classical Indian philosophy with its perhaps fourteen or fifteen major schools during its 2,000 or so years.

The Sanskrit word used most commonly in philosophic as well as psychological investigations of sense perception in classical India is *pratyakṣa*, etymologically “before the eyes” or “experientially evident” as an adjective and “immediate experience” or “sense experience” as a noun. Internal perceptions such as of thought and emotion, pleasure and pain, and indeed of a “self,” *ātman*, are considered in Nyāya to be mediated by a “mind” or, in a better translation, an “internal organ,” *manas*. A perception that targets a preceding perception or another cognition or mental event is given a special word, *anuvyayasāya*, “apperception,” literally an “after-cognition,” a type of perception that is especially important in cross-school

controversies, as will be brought out in a later section. The internal organ, *manas*, which also serves the function of channeling information from sense organs and bringing it together in perceptual knowledge for a self, is denied by Buddhist adversaries and others in other schools, and is hotly debated within Nyāya itself.

There is ambiguity in the use of the Sanskrit word *pratyakṣa*, both in Nyāya texts and elsewhere: (a) a mental event, a bit of occurrent knowledge that is sensory in character, and (b) the process or processes that produce it. The English word “perception” is similarly ambiguous. In Nyāya’s view, my current visual experience is perception (first sense) that has been generated by a visual process also called perception (second sense). In the first sense, perceptual knowledge, like inferential knowledge, etc., is a type of presentational experience, *anubhava*, which is defined as experience having intentionality or objecthood, *viśayatā*. Perception in the first sense has both phenomenological character and an epistemological role that Nyāya philosophers consider to be derivative from its production by perception as a causal process in the second sense of the word. Early Nyāya authors move back and forth between thinking about perceptual knowledge as richly presentational without the mediation of concepts or words and thinking about it as embedding, and justifying, certain conceptually mediated propositions. Later the distinction becomes hard and fast. On the one hand, perceptual cognition has a phenomenological inside, richer than anything anyone could say about it or its objects, and on the other, as the result of a perceptual process, it plays a foundational role in giving us knowledge of the world (including the interior world) through the formation of mental or memory dispositions, *saṃskāra*. And perceptual processes are crucial not just for perceptual knowledge but also for inferential, analogical, and testimonial knowledge in obvious ways, although there is much complexity in the details of the dependence, most of which is beyond the purview of this paper. Since the other knowledge sources and their results as recognized in Nyāya are thought to depend on perception as a knowledge-generator (*pramāṇa*), perception is said to be the premier (*jyeṣṭha*) knowledge source.

It is worth pausing on a key idea for bridging Nyāya theory with analytic epistemology, namely, that Nyāya assumes that so-called standing or non-occurrent knowledge that *p* (I know what my name is when I am not thinking about it) requires at least one moment of occurrent knowledge that *p*, which forms a mental disposition, *saṃskāra*, that holds information from the workings of a knowledge source for later retrieval. Such later retrieval includes what is called “concept-laden” perception as opposed to the *merely* phenomenological perception with its colors and sounds.

The full-fledged Nyāya theory, in both its epistemological and psychological forms, becomes clear, to my sensibilities, for the first time with Uddyotakara (seventh century), who battles Buddhist views at every turn, and even clearer with the later Nyāya author Vācaspati Miśra (tenth century) who uses Gautama’s definition of perception to distinguish “concept-laden” from “concept-free” perception, *savikalpaka* and *nirvikalpaka pratyakṣa*. This is the conclusion I draw in my *Epistemology in Classical India* (2012), whose chapter on perception I rely on in particular in this current effort where I focus less exclusively on the epistemology advanced by Nyāya in order to include more of the psychological theorizing. (For a more elaborate presentation of the epistemological theory, see Phillips 2012.) In addition to its epistemological role, Nyāya’s causal theory of perception is a quaint piece of psychology that is continuous with understandings of perception in medical and other texts belonging to genre different from philosophy and its cross-school wranglings. And it is from a psychological point of view that Nyāya’s theory of concept formation is best appreciated, in my opinion, as well as many aspects of the purported ties between the school’s perception theory and its ontology.

Nyāya ontology is developed in consort with a “sister” school of Vaiśeṣika which from the earliest is focused on questions of “being,” generally speaking, in contrast to Nyāya’s focus on knowledge. Vaiśeṣika is another school within the broad umbrella of Vedic culture (Buddhists reject the Veda, etc.), presenting slight differences with Nyāya in the early period and merged with Nyāya from Udayana (c. 1000) on. Buddhists espousing momentariness and phenomenalism are common opponents from the earliest texts. And Buddhist reasoners are polemically matched also by Mīmāṃsā, another “Vedic” school that engages Buddhists in philosophy and is, like Nyāya and Vaiśeṣika, realist, but whose ontology is tied more to language than to perception. Some other “Vedic” schools, such as Advaita Vedānta, tend to side with Buddhist anti-realists. The classical scene is incredibly rich in metaphysics, and Nyāya philosophers, who embrace an atomism along with Vaiśeṣika, also contend with a holistic view of physical things that is very old, a “Sāṃkhya” dualism of individual selves distinct from a homogeneous “nature,” *prakṛti*. It could be a very long book that treated classical Indian theories of perception to include all the schools.

Perception and knowledge

There seems to be some confusion in the writings of the sūtra-maker Gautama and his expositor Vātsyāyana (c. 450) about if and why perception should be regarded as embedding propositional content. But according to Vācaspati there are clearly two varieties of perception, the nonconceptual and the conceptual, with only the latter having full propositional content. The other may be viewed as a stage or causal factor in the perceptual process. The concept-laden variety is apperceptible and gets verbalized in speech acts, guiding voluntary action in general (*pravṛtti*), whereas the concept-free is inaccessible except through inference, as the later, so-called “new” Nyāya philosopher Gaṅgeśa (fourteenth century) emphasizes. In other words, in so far as we can talk about what we directly perceive, even phenomenologically rich perceptual presentations come pre-conceptualized. The exception that proves the rule is a first-time experience where it is thought that the concept comes untinged by previous categorization, for example, a child seeing and recognizing a cow for the very first time without previously knowing what one is. There the concept comes only from the world, from the cowhood inhering in the cow encountered, without mental shaping due to a *saṃskāra*, a “mental disposition,” formed by previous experience.

And so the *Nyāya-sūtra* definition of perception runs in Vācaspati’s interpretation: “Perception is a cognitive event generated by sense organ/object connection, not expressible in words, (and in a second variety is) unerring and determinate.” Perhaps to show Nyāya’s appreciation of perception’s phenomenological side, Vācaspati concedes to Yogācāra that there is concept-free perception, *nirvikalpaka*, free from thought and imagination, *vikalpa*. According to the Buddhists, we project ideas (*vikalpa*) and conceptually color perceptions, constructing “convenient fictions” according to our desires. So-called concept-laden perception, which is determinate and verbalizable, is really a form of inference, according to the Yogācāra camp. Vācaspati, and following him Gaṅgeśa, concede that there is some mental shaping of just about all perceptual events—a subject’s previous experience is normally one of many causal factors contributing to the result that is a current perception, an occurrent bit of perceptual knowledge—all except for things seen and recognized for the first time by someone uninformed. But there is also in general a concept-free, first stage of the process leading to the concept-laden result, a first stage where there is no mental shaping. Still, it is of course only the concept-laden, that which embeds propositions, that is interesting for epistemology. Among scholars, the point is brought out best, to my mind, by Arindam

Chakrabarti (2000) but also by Matilal (*Perception*, 1986) in a study that is broad and penetrating. Moreover, practically all the later philosophers in all the schools come to recognize that common patterns of behavior and speech, *vyavahāra*, are touchstones for theory (Mohanty 1992), somewhat in the manner of the Humean maxim for empiricists, “Save the appearances.”

In sum, Nyāya philosophers champion the view that perception is none the worse for being concept-laden in that concepts are features of the world as impressed upon our minds or, more properly, selves (selves house cognitive *saṃskāra*). Perception founds true beliefs, and the repeatable predicates and concepts (“cowhood”) perceptually acquired pick out constituents of real objects, things that themselves reoccur. If perception were not concept-laden, it could not be a source or method of knowledge, and identification of it would not be certificational. But of course it is (“Go and see for yourself”). In this way, Nyāya finds a justificatory role for perception. Perceptual *knowledge* does not require awareness of perception as a justifier, but when a bit of knowledge is challenged, pointing to perception can certify what’s known and thus the process, or more precisely its identification, does play the role of a justifier.

Nyāya views any sensible characteristic as expressible in a declarative sentence, “That’s blue,” for instance. Everything knowable is nameable and vice versa. Some so-called new Nyāya theorists (from about 1200 on, theorists whose central focus is no longer the *Nyāya-sūtra*) say that the object perceived, a lotus, for instance, is known in the first, nonconceptual stage as an individual whole, both in its individuality and as having a character. But the character, the thing’s being blue as opposed to red, and its being here right now, are not known without the mediation of concepts, it is reasoned by the later theorists. Seeing is “seeing as” and is “shot through with words,” to use the expression of the grammarian, Bhartrhari (Matilal 1986: 342). Concepts begin as features of things, whether as substances, universals, actions, or another category. Nyāya’s theory of concept formation is thoroughly realist. A verbalizable perception of a cow has its intentionality directed toward the real cow, not toward sense data, not toward what some call sensory objects proper such as colors, shapes, and sounds.

But what about illusion, the subjectivist asks. Nyāya’s answer exposes the heart of classical Indian realism, to wit, that the predication content, the presentation or perceptual indication of F-hood, originates in things’ really being F, through previous veridical experience of F-hood. A commonly cited example is a piece of shell misperceived as silver. The silverhood predication in the verbalization of the perception-like experience is available to become illusory predication content through previous veridical experience of silver. It gets fused into a current perception-like event by means of a foul-up in the normal causal process through the arousing of a silverhood memory-disposition (*saṃskāra*) formed by previous experience of silver, or, possibly, by testimony. The content or intentionality of an illusion is to be explained causally as generated by real features of real things just as is genuine perception, although they are distinct cognitive types. Genuine perception is factive; illusion is a perception-imitator (“You don’t really see John because that is in fact Bill; you only think you see him”).

Nyāya thus embraces a disjunctivism when considering perception from a metaphysical point of view: illusion (which fails to present things as they are) and genuine perception (which is factive) are critters of different types in that cognitions are identified in apperception by their intentionality, their “objecthood,” what they are about. “This is silver” in the face of shell has split intentionality, to wit, to a “this” in front but also to silverhood as instanced in real pieces of silver, whereas “This is silver” in the face of real silver has a unified

intentionality, something in front that really houses silverhood. Illusion involves projection into current cognition of predication content preserved in memory, as, admittedly, does true perception, too. However, the fusion itself is not problematic. For example, sometimes the fusion of an element preserved in memory is cross-sensory: tasting sourness, for instance, when perceiving a lemon by sight or smelling a piece of sandalwood which is seen at too far a distance for actual olfactory stimulation (Gaṅgeśa 2004: 124). These are cases of veridical perception with an obvious admixture or tinge of memory. Nyāya philosophers mention them to make vivid the point that perceptually formed dispositions can be so enlivened as to make cognitive content appear sensory when we know it is a matter of memory. Illusion, according to Nyāya, is to be analyzed similarly. But unlike veridical cases of projection, illusion involves taking something to be what it is not, a seeing or perceiving it through a “misplaced” qualifier. This means that concept-laden perception is combinational—a position taken by Gautama himself and much elaborated by Vātsyāyana and other commentators in sūtras apparently aimed at an early form of Buddhist subjectivism (*Nyāya-sūtra* 4.2.26–36).

In sum, thought-laden perception gets its content not only from the object in connection with the sense organ but also from the classificational power of the mind or self. With the perceptual cognition, “That’s a pot,” for instance, the pot as an individual in connection with a sensory faculty is responsible for the awareness of a property-bearer, for what is called the “qualificandum” portion of the perception, without admixture of memory, but the sensory connection is not by itself responsible for the qualifier portion, the pothood, also identified as the “predication content” (*prakāra*, the verbalizable “way” something appears), the thing’s classification as a pot. The classificational power of the mind should not, however, be understood as innate so much as the product of experience over the course of a lifetime. Repeatable features of reality get impressed on the mind or self in the form of memory dispositions. That is, in perceiving *a* as an *F*, normally an *F-samskāra* formed by previous knowledge-source-produced bits of occurrent cognition of things *F* would be a causal factor. The perception’s own content includes the repeatable nature of the qualifier through the operation of this factor. We see the tree as a tree.

Furthermore, determinate, concept-laden perception is a cognizing of a qualificandum *through* a qualifier: things have multiple properties some of which normally go undetected on any given occasion of experience. One can see Devadatta without seeing his back. Wholes are implicit in their parts, the very notion of which makes no sense cut off from that of the whole: parts are parts of a whole (*Nyāya-sūtra* 4.2.15, for instance). And if I can touch what I have seen, then when I am only touching the thing, I will not normally be aware of the thing’s color perceptually. If the ontological layering of things having qualifiers were not reflected in the causal ordering of an indeterminate perception feeding, so to say, the determinate, then perception of a qualificandum should entail that the “thick” particular be presented, i.e. the thing with all its properties, and, as Gaṅgeśa argues, a blind person in touching a yellow piece of cloth would know its color as yellow (2004: 391–392).

To back up a little, we need to appreciate that the rendering “perception” for the Sanskrit word *pratyakṣa* as employed in Nyāya is a little misleading. The English term “knowledge” is normally used to imply truth of a belief, and similarly for *pratyakṣa*, substituting veridicality for truth and awareness for belief. Perhaps we should translate *pratyakṣa* as “perception[★]” or “perception^k.” If what was considered a bit of knowledge is discovered to be in fact a false belief, then we say in English that there was no knowledge in the first place, only a belief that was considered true and warranted. The same logic holds for *pratyakṣa*: if what was considered a perceptual awareness is discovered to be in fact non-veridical, then it is said that there was no perception[★] in the first place, only an awareness that was considered veridical and produced by the organs of sense.

There is a nice tie between the veridicality presupposition in the use of the term *pratyakṣa* in Nyāya and an important point about default justification, fallibility, and the burden of proof that is central to much classical Indian epistemology and especially Nyāya. This is that doubt, like all awareness, has grounds, indeed causal grounds, such as one's inability to discern a distant object that appears, e.g., to be perhaps a post, perhaps a person. In such situations, we are called to look to reliable sources of information to resolve the doubt. But when the conditions for such meaningful doubt do not obtain—regarding sense experience, when conditions for doubting the reality of what we see, etc., do not obtain—then we proceed, and have every right to proceed, assuming the experience's veridicality. Veridicality is the default assumption. And the defeasibility, or fallibility, of perceptual judgments, contributes to this right, to the default being an assumption of veridicality (along with an assumption of the truth of perceptual judgments). Were we to claim infallibility, or certitude, then the burden of proof would be on our shoulders; that is to say, the conditions for meaningful doubt would be a lot less stringent. Much of this position is worked out by Nyāya philosophers in response to skepticism advanced by the Buddhist Madhyamika school of Nāgārjuna.

Let us focus now on epistemic justification. Nyāya has two levels to its epistemology and finds there to be two grades of knowledge captured by different Sanskrit words. The distinction is roughly between animal or unreflective knowledge and reflective knowledge, or, as Nyāya would say, knowledge certified. For the first type, the term is *pramā*, the result of the workings of a knowledge source, *pramāṇa* (the suffix *-aṇa* indicating instrumental causality); for the second, the terms are *nirṇaya* and *niścaya*, “certainty” or a state of confidence that constitutes a higher barrier to doubt, as shown in unhesitating action (*niṣkampa-pravṛtti*).

According to Nyāya, knowledge flows at the first level out of causal connections, natural processes that generate true beliefs, perception, inference, and testimony. But when it comes to certification, Nyāya concerns itself either with arguments or with properties that are signs of *pramāṇa* operation and thus criteria for warranted beliefs of a basic sort. Such “modest” foundationalism amounts to source-identification providing warrant that is not conditional. Indeed, putative source-identification is usually enough.

Thus concerning certification, Nyāya lines up with the internalist in contemporary analytic epistemology. By attending to the nature of perception, inference, and testimony, which at the first level operate with us un-self-consciously, we at the second level self-consciously certify what we know and believe. Note that Nyāya's internalism flows out of its externalism. And while certification is unnecessary for many bits of knowledge, it is entirely necessary for theses of philosophy, which are all controversial. Where it is not necessary is in rapidly acquired and rapidly lost bits of perceptual knowledge to which one is mainly indifferent.

Controversy is the spur to philosophy, Nyāya philosophers tell us, the spur to what is termed *nyāya*, “critical inquiry and reasoning,” directed to the resolution of doubt and dispute. That is, controversy is a cause of legitimate doubt, which in turn motivates *nyāya* (the procedures responsible for the name of the school). Unlike early Western empiricists in the tradition of Descartes, we as critical thinkers do not start with foundational knowledge and work out to knowledge of the world. Rather, we end doubt and controversy once it arises by employing—as best we can and self-consciously as opposed to non-self-consciously before the challenge—knowledge sources to ascertain the truth. These are to be supplemented, the tradition insists from the earliest, by *tarka*, “suppositional reasoning,” drawing out untoward consequences of an opponent's view, very much in the spirit of Socratic *elenchus*. At the second level, *pramāṇa* are “methods of knowledge” as opposed to simply natural processes, as indeed is *tarka*, the “reasoning” that is prized as a peculiarly critical tool.

In sum, the Nyāya concept of epistemic justification, or, better, certification, centers on arguments whose premises if challenged can be justified in the end by foundational considerations. But these are not the foundations of the Cartesians in the West. For Nyāya, our beliefs form a coherent system of mutual support, and anything that we know can be a premise in an argument. Then in addition to this coherentism, there is a modest foundationalism: beliefs identified as the results of perception, inference, or testimony are certified, presumptively, without further argument, unless there emerges a defeater bringing the identification into doubt (“You are too far away to see clearly”). Thus the topic of defeaters, including states prone to illusion such as having hepatitis and seeing white things as yellow, inferential fallacies, patterns of false or misleading testimony, looms large in Nyāya epistemology (see, e.g., Phillips 2017, “Fallacies and Defeaters in Early Navya Nyāya”).

Objects perceived

Let us move on to a related topic. What do we perceive? Throughout classical thought, there are sharp disagreements about the types of things presented in immediate experience as well as those for which our knowledge is indirect, based on empirical evidence. Nyāya defends the perceptibility of several controversial critters: universals, inherence and other relations, absences or negative facts (Devadatta’s not being at home) along with things made of different types of atom. Material things have parts that make up individuals which are nonetheless considered more than their parts. Nyāya also holds that the self and awareness itself are perceptible, positions the denial of which is at the center of much Buddhist metaphysics. Issues about perceptual media (such as light, the medium of vision, and ether, the medium of hearing), about occult or spiritual perceptibles, and about the very existence of objects in independence of consciousness are hotly debated across schools. Nyāya’s view should not be thought to represent the whole or even the mainstream of classical conceptions of physical reality. But there is a certain sharing with medical texts, as mentioned, as well as with the fellow realist school of Vaiśeṣika, and, it is important to note, Mīmāṃsā, which has an extensive literature, with dozens of texts spanning, like Nyāya, twenty or so centuries.

Each of the external sensory modalities involves a complicated physical process including a bodily organ and an object or objects perceived. There is an important distinction between organs that connect with their objects within the living body, without traveling outside, and the visual organ that does travel to the location of the object seen. The seat or resting place of vision is the eyes, but the visual organ itself expands as rays stretching out of the body as swiftly as light, which carries it, coming into contact with objects at a distance and spreading over their illumined surfaces. In this way it is thought that the sensory connection with a lotus, for example, occurs at the site of the lotus. (Phenomenologically, it must be admitted, I think, that it seems that way: we see the lotus there where it is, in the pond, not in our heads.) The expansion of the visual organ occurs practically instantaneously, riding on light: there has to be light connecting the subject’s eyes with the lotus perceived, light being the medium on which or through which the expansion or traveling occurs, without blockage.

Another crucial plank in the theory of visual perception is that everything with determinate form has a size, with sizes coming in three fundamental varieties, the atomic (the smallest size), the pervasive (the largest size), and the intermediate (ranging from the size of the dyad—two atoms combined—to very large things that are not pervasive). Now in contemporary terms, Nyāya embraces an “interactive dualism”: mental causation is endorsed, and one side of the dualism, namely, selves (*ātman*), which are non-material substances with determinate form, are inferred to be pervasive in size by way of an eliminative argument

(intermediate-sized things are divisible but a self is indivisible, and a self is not atomic because a self does not combine with other selves). Sensory cognitions depend on many factors, including, fundamentally, a self's embodiment in a living person. But when a person's visual organ, itself a kind of ray, though imperceptible and known only by inference, rides on rays of light to contact a lotus, the visual event occurs at the site of the lotus in that the perceiving self, being pervasive, is already there. Its body has extended, so to say, visually, to the lotus perceived.

Thus, the mechanism of sight is assimilated to that of touch. The other organs—touch, hearing, smelling, and tasting—do not travel or expand the body. For example, smelling requires that small particles of the thing smelled travel to the olfactory organ located in the nose, little molecules of sandalwood paste, for example, coming into contact with the olfactory organ. With hearing, there are advocates of a traveling faculty, but the mainstream view in Nyāya is that sounds are transmitted in a special element called ether, *ākāśa*, reaching the organ located in the earholes. Some argue that the ether as delimited by the earholes is the sensory organ.

Divisibility is the consideration put forth to prove the existence of atoms, which are said to fall into four kinds according to the nature of the perceptibility of objects they compose: the earthen, the watery, the fiery, and the airy. Earthen things are perceptible by smell, taste, touch, sight, and sound; watery things by taste, touch, sight, and sound; the fiery by touch, sight, and sound; the airy by touch alone. Although contact of air with leaves, for example, typically makes a sound, the air is not directly perceived but inferred from that evidence. A fifth material element is, as mentioned, ether, *ākāśa*, the medium of sound, which is considered pervasive and non-atomic.

The question of the relations that hold between sense organs and the objects they grasp extends beyond substances and things made of atoms to properties and actions, categories that are extensively subdivided. Consider universals, for instance, the cowhood inhering in Bessie and Flossie and Śābalya, which according to Nyāya is responsible for recurrent cognitions such as “A cow,” “Another,” “Another,” and so on. An individual pot may be known through the instrumentation of the visual organ, or the organ of touch, typically, but the thing's being a pot, its pothood, so to say, is known through the relation of inherence-in-that-which-is-in-contact-with-the-sensory-organ. Uddyotakara finds six major types of sensory connection, all of which are greatly elaborated in later literature. The relationship of an absence or negative fact to the operative sense faculty is extensively debated, both within Nyāya and with philosophers of other schools, in particular Mīmāṃsā, whose authors tend to analyze absences away whereas Nyāya thinkers see them as a distinct category of things real and knowable, such as an absence of a pot on the ground or of my glasses on the table.

Furthermore, the visual organ may come into direct contact with the pot, but the pot's color is not the sort of thing with which there could be direct contact, contact being a relation that holds only between substances, not however also with universals and absences. Hundreds of lines of text are devoted to issues concerning operative sensory relations. What is the nature of the relations among all the factors responsible for perceptual knowledge, and for each type of object perceived, e.g., substance (and different kinds of substance), quality (and different types of quality, colors, sounds, etc.), motion, universal, and absence? The Nyāya epistemological project is threatened by a need for special rules for all the different kinds of things perceived. We may call this the school's “generality problem.” Attempts to formulate the diverse rules needed fill large portions of later texts in particular.

An especially contentious issue is how an inference-sanctioning “pervasion” is known: every locus of F as also a locus of G *in nature*, thus the rule, All Fs are Gs, which allows inference from *a* being an F to *a* being a G. The dominant view seems to be that certain

universals or class characters (natural-kind characters) *along with* the relations among them are presented perceptually, e.g., as cowhood is known in recurrent experience (“A cow,” “Another,” “Another”) so, similarly, smoke and fire conjoined, as is seen numerous times and interpreted as a causal relationship. Other universals and relations are known by inference, e.g., atomicity and the like. Causal relations hold among particulars but only as instantiating universals, it is observed. A match, for example, when struck is a cause of fire but only as a match, that is, as possessing matchhood, not as a substance possessing substancehood although all matches are substances (Bhattacharyya 1987). Thus pervasion comes to be understood as F-hood being pervaded by G-hood, such that something known to be an F prompts the inferential knowledge that it is also a G.

To counter the objection that from knowing the universal we should be acquainted with things strewn throughout all time, our realists insist that we do know something about future particulars, cows yet to be born, for instance, from knowing cowhood. Of course, not everything F or G is known perceptually; what is known is F-hood and G-hood and the relation between them. Furthermore, a child may not be able to recognize cowhood in its generality although the universal is available in the presence of Bessie; there is a difference between seeing cowhood and seeing it as cowhood. Nyāya theorists champion a certain kind of fallibilism, pointing to training required in many cases to recognize something for what it is. Thus the relation between, e.g., smokiness and fieriness may not be recognized, or we may think we perceive a connection and a future counterinstance proves us wrong. It is *wide experience* of correlations of things F and G that gives us confidence, Udayana says, but other authors, Maṇikanṭha (thirteenth century) argue that a universal and even a causal relationship can be recognized in a single occurrence. A pervasion is, after all, a natural fact. Since Buddhists and logicians of other schools find very different underpinnings for inference, it is easy to surmise, without seeing further intricacies and theoretical moves, that, in sum, there was in classical India a many-sided discussion of the problem of induction and the relationship of perception to generalities, to which Nyāya authors were prime contributors. (Chakrabarti 2010 is a sophisticated defense as well as exposition of the Nyāya theory.)

Other issues contended on grounds of direct perceptibility include the relation our realists find between a property and a property-bearer (there is no such distinction, claim Buddhists and, for different reasons, Advaita Vedāntins), absences or negative facts, and the self or awareness itself. For restrictions of space, let us take up just one more area of controversy, mereology, the theory of parts and wholes.

Buddhists in particular attack the commonsense view defended by Nyāya that a whole, even an army or a forest, is a reality over and above the totality of its components (the soldiers, etc., the trees, etc.). Nyāya authors claim that we perceive wholes, a tree as a tree, though we do not see all the parts of the thing, the roots, for instance, as insisted by Buddhists and other adversaries. The deep issue is what counts as basic evidence, although counterfactual arguments (*tarka*) are also advanced (e.g., since parts have further parts, if we couldn’t perceive wholes, nothing could be perceived). Yogācāra Buddhists maintain that atomic-event presentations (sense data) common to illusions and veridical experiences are the basic evidence. Nyāya philosophers counter that we see wholes, we directly perceive wholes. Perception of wholes is basic.

Yogic perception and self-awareness

Probably through the influence of mysticism—Upaniṣadic, Buddhist, and Jaina—verbalization of experience, however simple and direct, becomes suspect in comparison with yogic and meditational experience (a theme stressed by many scholars, recently by Bronkhorst

2017). Yogic or spiritual experience is considered ineffable and “concept-free,” generally speaking, but is nevertheless thought to be like sense experience and thus a source of knowledge, *yaugika-pratyakṣa*, and this according to several schools, including, surprisingly, Nyāya. In very early Upaniṣads (c. 500 BCE), mystical and yogic experience is said to center upon a discovery of an ordinarily hidden but divine “self,” *ātman*. In early Buddhist texts (c. 250 BCE), by contrast, a doctrine of “no-self,” *anātman*, is central both soteriologically and for positions about perception and the world, although meditation and yogic practices are similarly endorsed. Buddhist theorists list varieties of consciousness in efforts to analyze the make-up of a false conglomerate commonly thought to be a self. Thus emerges a picture of streams of experience integrated into an ego that is erroneously thought to endure. Despite its metaphysical dualism and view of a self as an enduring substance, Nyāya accepts much of the Buddhist picture.

Indeed, throughout the approximately 2,000-year history of classical Indian schools, cognition in general is thought of as episodic. Nyāya’s along with other classical texts making pronouncements in psychology, whether worldly or spiritual or both, try to trace a complex of causal factors giving rise to particular types of episodic awareness, typically with yogic experiences included with sense experiences within a broader project.

And like almost all the classical philosophies that encourage yoga practice, Nyāya asserts an epistemic parallelism implicit in the concept of *yaugika-pratyakṣa*, “yogic perception”: yogic perception is a knowledge source, *pramāṇa*, like sense perception. Nyāya authors throughout the centuries do indeed endorse *yaugika-pratyakṣa*, glossed as “yoga-practice-born perception” (*yogaja-pratyakṣa*), and at least in principle certain spiritual matters by it putatively revealed. But many philosophers in the school do not seem to have been yogins themselves, presenting views that are minor extensions of the psychology of sense perception or neglecting yogic psychology altogether. Nevertheless, the mainstream idea is that through yoga and the accumulation of moral or religious merit, sense organs are modified, particularly the inner organ (*manas*), such that spiritual matters, or things subtle, remote or normally hidden, are directly perceived. Although Uddyotakara analyzes statements using the first-person pronoun *aham* as referring to an individual self (Taber 2012), it is consistently held that people do not ordinarily know and act in such a way that reflects the deep truth that the self is distinct from the body and mind. To teach and defend this truth (*tattva*) is the fundamental purpose of philosophy, say Gautama and Vātsyāyana, and later authors tend to concur.

Now although any moment of awareness lasts only an instant and is followed by a distinct mental occurrence, the ultimate goal of life, of all knowledge and effort, according to Gautama and practically every Nyāya author (with a few exceptions), is *permanently* (*nitya*) to disengage the *manas* (the mind or inner organ) from worldly preoccupations in order *constantly* (*nitya*) to rest in the self. In this way, the school upholds a variety of the pan-indic religious goal commonly referred to as “liberation,” *mukti*, but also *nirvāṇa* and “enlightenment”; *apavarga*, “final beatitude,” is the preferred Nyāya conception and term. Yoga practice and deep meditation (*samādhi*) are explicitly pointed to as instrumental to this goal (see *Nyāya-sūtra* 4.2.38 and 4.2.42, in particular).

Vātsyāyana in his commentary on a stretch of sūtras on yoga practice at the end of *Nyāya-sūtra* chapter 4 (4.2.38–51) highlights the practice of *pratyāhāra*, “(sensory) withdrawal,” which connects with the later Nyāya doctrine of apperception, *anuvyavasāya*, where the mind or *manas* is thought to present to the self a cognition as object, thus, a bit of knowledge of a bit of, for instance, sensory knowledge. Here proper sensory objects, sounds, etc., are in focus as opposed to, for instance, the drum making the noise.

Thus, despite its realism about concept formation and the objects of perceptual knowledge, etc., as full-bodied material things, Nyāya finds room in its theory of apperception, *anuvyavasāya*, for talk of sense data, sights, smells, sounds, touches, etc. Other mental events such as pleasures and pains, desires and intentions, and any occurrent cognition responsible for verbalizable knowledge, are also accessible in apperception. Now the *Yoga-sūtra* defines a “limb” of yogic practice, *pratyāhāra*, “pulling back,” as (2.55) “the disconnection of the sense organs from their objects as if in imitation of the talent of the mind (to be still). From that comes utter control of the sense organs.” This seems to be the same idea as Vātsyāyana’s, which is also present in *Bhagavad Gītā* chapter 6 and several Upanishads. I think Vātsyāyana’s borrowing is direct from the *Yoga-sūtra*, but it may have been from common sources. In any case, the alliance between Nyāya and yoga teachings seems to me tight (see in particular *Nyāya-sūtra* 4.2.46 where *yoga-śāstra* is mentioned).

Apperception includes perception of one’s self, *ātman*, in that all verbalizable perception grasps a qualificandum through a qualifier, in this case a perception scoping a self as qualificandum and, e.g., a bit of perceptual knowledge as the scoped qualifier. Thus “I perceive myself seeing a pot” would be an appropriate verbalization. All perception is object-directed. Apperception is directed toward one’s own self as qualified by cognitive and affective properties. There is no *perception* of self as unclothed, bereft of properties, although the position on “final beatitude,” *apavarga*, is sometimes misunderstood as a kind of self-perception or self-consciousness. In Nyāya, there is no cognition without embodiment, although the self is considered fundamentally distinct from the body. Nyāya authors, I would say, do not presume to speculate on the nature of consciousness in *apavarga* beyond defending the position that it is possible to bring an end to suffering and reincarnation.

To tie up a loose end, again note that mental dispositions, *saṃskāra*, are thought to lie in the self, which endures, not the body, which is ever-changing. A principle Nyāya argument for a self centers on the phenomenon of recognition, as in “This is that Devadatta whom I saw yesterday,” where, as explained, previous experience of Devadatta informs a current perception. This would not be possible, it is argued, without a self to house the Devadatta-*saṃskāra* formed by the experience yesterday.

Nyāya holds that no awareness is self-illuminating, although, as we have now seen, there is not only its *apavarga* teaching but also a doctrine of apperception understood as a cognition targeting something internal. Other schools take different positions on the question of self-consciousness in perceptual awareness. Yogācāra Buddhists hold that every cognition is self-aware. To postulate an additional cognizer would be otiose. Sāṃkhya-Yoga puts forth a strict dualism of consciousness and nature, with all perceptual apparatus as well as content regarded as part of nature. Consciousness is purely a witness, self-aware but with no fuller, thicker relation to things witnessed. Advaita Vedānta takes a similar view: self-aware consciousness has no relation to modifications of an internal organ other than to be their witness. Mīmāṃsā joins Nyāya in upholding more integrated positions. For the Bhāṭṭa branch (one of two main subschools), perception is considered a personal act, creating the property of “being-perceived” in an object perceived, a property from which a perceiving subject may be inferred, by the original subject or someone else. For the Bhāṭṭa’s rival Prābhākara subschool, awareness of a subject or self (*ātman*) is considered intrinsic to every cognitive occurrence. The Nyāya theory of awareness, perceptual and otherwise, is a mainstay of the school’s worldview, distinguishing it from many competitors.

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PART II

Problems of perception in ancient philosophy

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INTRODUCTION TO PART II

Brian Glenney and José Filipe Silva

There are things which exist, but whose nature it is to appear either not to be such as they are or to be things that do not exist, e.g. a sketch or a dream; for these are something but are not the things the appearance of which they produce in us.

(Aristotle, Metaphysics, 1024b22–24)

As we have noted in the General Introduction, this volume diverges from the traditional classical approach to perception as our essays focus the possibility of failing to perceive the world rather than succeeding in doing so. Both approaches, however, share a narrative about the way we come to know the world and its objects, the sensible properties of material things. One of the striking things one notices, when turning to examine the way perception is understood in ancient times is how low-ranking perception is as a form of knowledge, at least in comparison with rational forms of knowledge. After all, as Plato points out, objects of perception are fleeting as they shift in appearance, offering no real glimpse to the way things are apart from our perceiving them (see, e.g., *Theaetetus*, 160d1–3). So, perception as a process fails to give us insight into how things really are. And when it does, it gives insight into what is merely temporary or accidental.

By contrast, knowledge properly said is of what is always and in the same way exemplified by universals or the intelligible Forms, which resist corruption and change. Perception seems relevant only to the extent that it is the source for making present to cognitive subjects those things about which one can know the essences or quiddities or the true natures (see *Theaetetus*, 186d2–3). In that sense, perception has an instrumental value: it supplies the basic information from which true knowledge is to come about by way of some rational process like abstraction. For Aristotle, we come to know universals by receiving particular sensory information and then peeling back what is particular (and material) to it in a way that allows its true essence to shine forth. Only by knowing “what it is” can we apprehend it in a way which counts toward true intellectual knowledge. Like many ancient and also medieval philosophers, knowledge of universals concerns a cognitive process of acquisition that is based on a layering of progressive de-particularization (and de-materialization), one that includes stories of the fallibility of perception. Such stories serve as plot twists toward successful conclusions once it is discovered what happens when the senses fail and how it is to be explained.

For much of the ancient period, perception operates around two central notions—assimilation and causality—and related subsidiary notions: likeness, similarity, proportionality, appropriated-ness, etc. The basic conception of perception starts with the existence of a relation of proportion between what a properly endowed perceiver can perceive on the basis of their bodily disposed sensible capacities and the properties of objects in the world and the objects themselves. For perception to be veridical, i.e. about the real properties of things, the medium (air and water in the case of vision) and the perceptual capacities of the perceiver must meet a number of standard or optimal conditions. Otherwise, i.e. in case these conditions are not met or are met in a substandard way, the process results in something being perceived in a way that does not correspond to the way it is: like colors in a dove's neck or a blue wall perceived as green when seen through a yellow glass.

The mainstream approach to the problems of perception can be described as categorizing cases in which (1) *nothing appears but I perceive something appearing* and (2) *something appears other than (what) it is*. All questions about perceptual errors arise from these two possibilities, so that we can say that perceptual errors are false perceptions: not because they do not exist but because our perceptions of things do not correspond to the way the things themselves are due to either (1) or (2). Things are of course more complicated for the ancient philosophers who do not assume that in normal cases we can perceive *things* out there in the world and that our perception of them can *correspond* accurately to the way things *are*. In other words, systemic problems arise beyond (1) and (2) when one's metaphysical picture denies that things are a certain way, a way that is stable and independent from the way we perceive them (as being). And with a history of such skepticism, we all must question if we are justified in holding any assumptions of a world that is stable, available to perceptual experience.

Perceptual experience is defined by its objects, what it is about or directed at, and by the capacities of the perceiving subject to receive information from these objects. But in order to take this information, the processes of perception require the existence of certain conditions both in the object, the medium (in the case of distal senses) and the perceiving subject. On the part of the object, this needs to have properties such that they come to be available to a subject, which both means that they are public and at a commensurate distance. These sensible properties are causally efficacious in the sense that in receiving them—whatever the mode of transmission of these sensible forms take—and all other conditions holding, any perceiver can have an accurate perception of the object and its publicly available properties. Accessibility is important because if the object does not make itself present to the perceiving power in a way that is conducive to perception, no actualization of its potentiality for perceiving takes place (Aristotle, *De anima*, 446a10). For example, a small object like a mite crawling on our hand may be perceptible as it is able to move the sense power, our hand might twitch instinctively, but it may be too small to actualize a perceptual experience—we might not actually feel a crawling mite. Thus, Aristotle's definition of perception as an affection whereby the sense power, which is potentially the sensible object, is actualized or activated when acted upon by that object (see Aristotle, *De anima* II, 5, 416b32–418a6) would not say that such a small object were perceived. In addition, an object may not be perceived due to an occluding medium of transmission, a callused hand in the case of a crawling mite, or due to the subject's sense organs being of a kind of disposition that prevents them from receiving the object without distortion of the sensible features of the object, being disposed to disease, or drunkenness and thereby carrying on the possibility for distortion. Lastly, the subject themselves must actively and selectively attend to the incoming sensory input for a subject to be said to have perceived it.

Ancient thinkers also identified accuracy conditions proportional to the standards for a situation's context, formulated in a strict or looser way, depending on the environmental demands. So, if the purpose of perception is for the perceiver to avoid a dangerous thing, the accuracy conditions are those that allow for the salient information concerning dangerousness to be made available. For a wolf to be so perceived as to trigger a reaction of escape from me, all it matters is that I perceive it as a dangerous, rather than that I perceive the wolf in all its different aspects, like the texture of its fur, the size of its teeth, etc., or even as a wolf (if the perceiver is a non-rational animal). The assumptions concerning what features themselves can be perceived also become a feature of these conditions. For we might assume that some properties of objects do not actually hold the features we perceive them as having. For instance, we might deny that we see an object's color because we do not actually think that color is in the object, as the early modern debate over primary and secondary qualities illustrates.

By what process did the ancients conceive of perception? As discussed in the introduction to this book, here we see the greatest divergence from other periods of history, as many ancient philosophers held to an extramission account of vision, where the eyes beam out to see just as a hand would stretch out to touch. For Plato, the beams consisted of "fire-particles" mixed with the sunlight. For the Stoic Epictetus, it was the soul itself that poured from the eyes to grasp objects. For other Stoics it was a cone of light that cast a "gleam" or "ray." For others, it was a medium in the air that made distant objects available to sight. Though it remains a mystery why this view finally became extinct, Katerina Ierodiakonou's chapter discusses two significant problems with it: (1) Why we can see into an illuminated room from the dark, but not in the reverse direction? And (2) why two people can see one another from rooms that are opposite and illuminated, although it is dark between the two rooms? While these problems exist for intromission theories that focus on the medium of light itself, these problems provide a basis for investigation of extramission's demise.

A final aspect worth considering is why ancient thinkers were not particularly interested in the phenomenology of perception. That is to say, where is there little discussion of nature of the subjective first-person perspective of our contact with the world that is largely true but as such requires a justification. One way to explain this is that ancient theories of perception simply avoided the materialistic aspects of explanation, i.e. explanations of what kind of things need to interact at the micro-level for us to be able to acquire information about the macro-properties of the existing material objects. Another related possibility is that for ancient philosophers, properties are assimilated rather than represented, the latter of which requires a sophisticated but as neutral as possible metaphysical and psychological model due to the aforementioned absence of fully materialistic micro-level of explanation. For instance, I perceive colors and sounds because there is a certain range within each perceptual kind of objects that determines what can hook onto my perceptual apparatus. But then there are all the other things that hook onto other perceptual faculties, that are equally grounded on things, but that do not have the same way of appearing that grants access to the lower level properties, a criterion of reliability such that we can hardly fail to successfully experience them. Take an example: I see an object as a gray extended figure, perceived as dangerous and identified as a wolf. Which of these features can I be mistaken about and what sort of cognitive resources do I need to have in order to know them? Once that part of the process is explained, how can I explicitly detail what conditions must be met for guaranteed accuracy about my perceptual experience?

While ancient philosophers avoided materialistic explanations, the mind–body problem, as we now conceive it, was gestating in the context of perceptual experience. For instance, as Anna Marmodoro argues in her chapter, Plotinus, “develops a complex argumentation which shows that the soul needs to be embodied, if it is to be able to perceive items in the natural world: ‘it is clear that sense-perception belongs to the soul in the body and working through the body’ (IV.4.23.48–49)” (Marmodoro, p. 81). While Plotinus is known for his work in understanding the nature of the soul and its parts, he was not neglectful of the very real gap between the soul and its embodiment, between cognitive acts and affections of the body, posing a pseudo-material intermediary, not unlike Descartes’ pineal gland. As Marmodoro continues, “Plotinus assumes that positing an intermediary whose matter is in between mental and physical stuff somehow ‘reduces’ the existing categorial gap between the soul and physical objects” (Marmodoro, p. 93). Of course, if we have learned anything, positing additional ontological entities in no way reconcile problems of the mind. The realization of this problem at such an early stage in philosophical thought, however, is remarkable and suggests that perhaps the mind–body problem is itself one that could be considered in the context of perception rather than mind itself.

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4

TWO PUZZLES IN POST-ARISTOTELIAN THEORIES OF VISION

Katerina Ierodiakonou

In section 10 of the treatise *Supplement to On the Soul*, the so-called *Mantissa*, its author, probably the late-second-century Aristotelian commentator Alexander of Aphrodisias,¹ argues against those who explained vision through, what he calls, the “co-tension” (*sunentasis*) of the air.² In subsections 4 and 5, in particular, he presents two closely related arguments based on what seem to have been treated in antiquity as standard puzzles to be solved by those who put forward theories of vision. The first puzzle asks why we can see into an illuminated room from the dark but not in the reverse direction, while the second asks why two people can see one another from rooms that are opposite and illuminated although it is dark between the two rooms. Alexander claims that those who explained vision through the co-tension of the air failed to offer a reasonable solution to both these puzzles. To support his claim, he presents a somewhat detailed account of the first puzzle, but he is rather concise when it comes to the second one. In what follows, I begin with an analysis of what Alexander reports about the first puzzle, and then I briefly comment on the second. Both puzzles seem to have been historically influential, since they have been presented at different periods as challenges to the extramission as well as the intromission theories of vision.

The Stoic extramission theory

Let me start by quoting Alexander’s text, changing at certain places Bob Sharples’ recent edition (2008) and translation (2004a):

Moreover, why are things in the dark not seen from the light, but things in the light [are seen] from the dark? To say that illuminated air, because it has been rarified, has more strength and can affect our perception by pressure (*epereisei*), while unilluminated air, because it has been slackened, cannot be co-tensioned (*sunenteinesthai*) by sight, even though it is denser than the illuminated one—how is this plausible? The opposite is reasonable, that what is denser can be co-tensioned more easily, especially as it is natural for this to happen to it, whenever things in the light are seen from the dark. But if the air in contact with the pupil, being unilluminated, is not of a nature to be tensioned (*enteinesthai*), but only the illuminated one, what difference does it make

whether the slackened part of the air is at this end or that, I mean adjacent to the one who sees or to what is seen? For it is reasonable that also when the air next to the pupil is unilluminated, and the illuminated one is next to the thing seen, the tension [which proceeds] from the sight should be undone again as it passes first through the unilluminated air and hard to move, and that, being undone, it should no longer be able to co-tension (*sunenteinein*) the illuminated one next to the thing seen. For [thus] things in the light should no more be seen by those in the darkness than vice versa.

(Mantissa 131.30–132.7)³

To understand Alexander's criticisms against his opponents' solution to this puzzle, it is first necessary to reconstruct their doctrine about the way visual perception functions. At the beginning of section 10, Alexander presents the theory of those who explained vision through the co-tension of the air as follows:⁴

There are some who say that seeing comes about through the co-tension of the air. For the air which is in contact with the pupil is pierced by the sight and shaped into a cone. When this is as it were stamped at its base by the objects of sight perception comes about, as with contact through a walking-stick.

(Mantissa 130.14–17; trans. R. W. Sharples with changes)⁵

Bob Sharples (2004a: 98–99; 2008: 187) has suggested that Alexander's opponents are the Stoics. But does the theory of vision described, here, correspond to the Stoic theory of vision as this is presented in our other sources?

All ancient reports on this topic agree that the process of visual perception was explained by the Stoics in parallel with touch; it involves the formation of a continuous substance between the perceiver's eyes and the perceived object, that is, a visual body in the shape of a cone with its base contiguous to the object. Indeed, this visual body is often compared in our sources with a walking stick, but also with the net and the rod through which a shock passes from the torpedo fish to the hands of the fisherman.⁶ It thus seems that, in this respect, the Stoics' views on vision constituted a further development of the part of Plato's extramission theory that postulated a visual body, formed by the fire particles emitted from the perceiver's eyes together with sunlight; for although they did not follow Plato in suggesting that fire particles are emitted from the eyes, they certainly defended the formation of a continuous substance that reaches out to the sense objects.⁷ In addition, they even seem to have been influenced by the central tenet of geometrical optics after Euclid, according to which multiple rays diverge from the eyes in a cone-shaped array.

There is an important disagreement, however, concerning what the Stoics had to say about the actual formation of this visual body. Some ancient sources clearly suggest that, according to the Stoics, the innate *pneuma*, which stretches from the soul to the perceiver's eyes, subsequently pours out from the eyes and grasps the object of visual perception.⁸ For instance, in his *Discourses*, the Stoic Epictetus explicitly says that the *pneuma* leaves the perceiver's eyes and reaches out all the way to the perceived objects:⁹

Is it, then, for no purpose that God has given you eyes, and for nothing that he has infused them with a spirit that is so powerful and ingenious that it can reach far out and gather impressions of the forms of visible objects? What messenger is as swift and attentive as that?

(Epictetus, Diss. 2.23.3; trans. R. Hard)¹⁰

A similar idea is also to be found in another Stoic work, namely in Cleomedes' *Caelestia*, although in this passage it is rays (*aktines*) that flow out from the eyes: "While the Sun appears larger and smaller to us, as similarly do the distances involving it, the [visual] cone that impinges in reality on it from the rays that flow out <from> the eye is necessarily very large" (Cleomedes, *Cael* II.1.57; trans. A. C. Bowen and R. B. Todd).¹¹

Moreover, the fourth-century Neoplatonist Calcidius unambiguously attributes to the Stoics an extramission theory of vision:

The Stoics attribute sight to the tension [or stretching] (*intentione*) of the innate *pneuma*, whose shape they liken to a cone. When this has proceeded from the interior of the eye, which is called the pupil, and when from this fine beginning its beginning has been enriched to solidity the further it extends, then when illumination has been placed near the visible thing, sight is poured out and extended in every direction.

(Calcidius, ad Tim. 237 = SVF 2.863; trans. D. Hahm)¹²

Finally, the same Stoic theory is reported by other late-antique sources as well as in the doxographical tradition, in which the *pneuma* is also sometimes substituted by the rays (Aulus Gellius, *Noct. att.* 5.16.2 = SVF 2.871; Aëtius, *Plac.* 4.15.1–3, 405.26–406.14) and by the gleam (*augê*: Philo, *De aet. mund.* 86.5–6 = SVF 2.612), or it is characterized as gleaming (*augoeides pneuma*: Geminus, *Frag. opt.* 24.11–12).

On the other hand, Diogenes Laertius does not give any indication whatsoever that, according to the Stoics, the innate *pneuma* leaves the eyes. He claims that the intervening air between the perceiver's eyes and the sense object is stretched or tensioned (*enteinomenou*) in such a way that it becomes able to register any change of state induced by the state of the object; subsequently, this change of state is further communicated to the eyes, and finally registered by the perceiver's soul:

Seeing takes place when the light between the visual faculty and the object is stretched into the shape of a cone, as Chrysippus says in the second book of his *Physics* and Apollodorus, too. The air adjacent to the pupil forms the tip of the cone with its base next to the visual object. What is seen is reported by means of the stretched air, as by a walking-stick.

(Diogenes Laertius 7.157 = SVF 2.876; trans. A. A. Long and D. N. Sedley)¹³

Similarly, as we have seen, Alexander (*Mantissa* 130.14–17) does not mention at all the *pneuma*, when he discusses the views of those who explained vision through the co-tension of the air. He simply says that the air in contact with the pupil is pierced by (*nuttomenon*) the sight and shaped into a cone, which is instantly conditioned in such a way that it becomes able to register any change of state induced by the state of the object.

Contemporary scholars have commented on the limited, scattered and rather late-ancient texts that present the Stoic theory of vision and pointed out the inconsistencies among the sources. Heinz Gerd Ingenkamp (1971) has argued that the inclusion of an extramission element in the Stoic theory of vision is the result of a confusion in the doxographical tradition and of the tendency to platonize the Stoic theory. Similarly, David Hahm (1978: 68–69) has claimed that the way Alexander and Diogenes summarize the Stoic doctrine, implying that the innate *pneuma* does not itself proceed to the sense object, most probably corresponds to Chrysippus' theory; he has suggested, moreover, two possible explanations of the

discrepancies among the ancient reports: either Chrysippus' theory was distorted by transmission through many generations of handbooks, or the Stoics themselves modified their theory of vision after the third century BCE. Contrary to these views, Scott Rubarth, in a yet unpublished article on the Stoic theory of vision, has taken seriously the textual evidence that presents it as an extramission theory. According to his interpretation, although it is true that the innate *pneuma* as such does not exit the eyes, the fiery element of the *pneuma*, i.e. the gleam, does extend outward in a shape of a cone; it subsequently meets with the object's gleam, which comes from the opposite direction, and this two-way flow of fire creates a tensed field of air that allows visual perception.¹⁴

It is not possible, here, to delve into the intricacies of this debate, which I postpone for another occasion; in my view, though, the early Stoics had an extramission theory of vision. Let me present in short the main arguments that, I think, support my claim: I agree with Scott Rubarth that no study of the Stoic doctrine should hastily discard the ancient sources that talk of *pneuma*, rays or gleam flowing out from the eyes, especially since some of these texts are by Stoic authors, for instance by Epictetus and Cleomedes. Also, I believe that Scott Rubarth is right to point out that it is unlikely for the extramission element to have been included in the later sources in an attempt to platonize the Stoics, since most of these texts are intended to distinguish the Stoics from Plato. Furthermore, it seems to me that Galen's testimony of the Stoics' views on visual perception should also be taken into serious consideration; for his criticism of the Stoic theory makes sense, only if they postulated the emission of *pneuma* from the eyes.¹⁵ To put it briefly, although Galen agrees with the Stoics that the innate *pneuma* is indispensable for visual perception, he strongly disagrees with them that its effect on the surrounding air is such as to create something like a walking stick that touches the perceived object.¹⁶ "And the optic *pneuma* cannot extend itself and acquire such a stream as to envelop the whole object viewed; for this is comparable to the Stoic drop that mixes with the whole sea" (Galen, *De Hipp. et Plat. plac.* 7.5.4, 454.4–7; trans. Ph. De Lacy).¹⁷

According to my interpretation, Galen claims that the *pneuma* cannot extend all the way to the sense object for two reasons: first, because it would be absurd to claim that the amount of *pneuma* issued from the perceiver's eyes is enough to reach out to an object situated far away; and second, because the Stoic extension of the *pneuma* presupposes that this blends with the surrounding air in a certain way which Galen finds unacceptable. That is to say, the Stoics claimed that the constituents in a mixture are related to one another through and through but retain all their properties, which means in this case that it is the innate *pneuma* itself that reaches out to the perceived object; on the other hand, Galen insists that, when the innate *pneuma* pokes at the air close to the perceiver's pupil, it completely assimilates it to itself and forms together with it a homogeneous body:

We are left, then, with the view that at the time when we look at something, the surrounding air becomes for us the kind of instrument that the nerve in the body is at all times. It seems that the effect produced on the air around us by the emission of the *pneuma* is of the same sort as the effect produced on it by the light of the sun. For sunlight, touching the upper limit of the air, transmits its power to the whole; and the vision that is carried through the optic nerves has a substance of the nature of *pneuma*, and when it strikes the surrounding air it produces by its first impact an alteration that is transmitted to the furthest distance—the surrounding air being, of course, a continuum, so that in a moment of time the alteration spreads to the whole of it.

(Galen, *De Hipp. et Plat. plac.* 7.5.5–7, 454.8–16; trans. Ph. De Lacy)¹⁸

But doesn't Galen's theory seem very similar to that of the unnamed philosophers of section 10 in the *Mantissa*, who explained vision through the co-tension of the air?

Studying closely the terminology of this section in the *Mantissa*, it is difficult to ignore the frequent use of the Greek verb *epereido*, which means "to press," as well as of the Greek noun *epereisis*, which means "pressure" or "impact."¹⁹ These terms occur here sixteen times and denote the pressure or impact of the sense object on the cone-shaped visual body.²⁰ Most importantly, there is no other occurrence of them in Alexander's writings and no other text that connects them with the Stoics;²¹ Galen, on the other hand, often uses them in his medical works.²² Does this imply that the theory of vision, discussed by the author of the *Mantissa* in section 10, belongs to Galen? I would be unwilling to defend such a position, since some features of the doctrine presented in this text clearly connect it to the Stoics; for instance, the notion of co-tension and the metaphor of the walking stick. Nevertheless, I think it is important, on the basis of the substantial evidence mentioned above, to disassociate the account of vision in section 10 of the *Mantissa* from Chrysippus and the early Stoa. I surmise that, if it is indeed a Stoic doctrine, it could be a later development, perhaps a modified version of the standard theory introduced by later Stoics, who tried in this way to reply to such criticisms as those vented by Galen. Besides, my general impression from a systematic reading of the *Mantissa* is that its author presents and argues against contemporary views, which have originated from earlier philosophical schools but have in the meantime been revised considerably.

So the attempt to reconstruct the theory of vision discussed in section 10 of the *Mantissa* inevitably led us to the problem of identifying its exponents. The next task is, of course, to study Alexander's arguments against this theory and assess their strength. In particular, it is time to focus on what Alexander has to say against the Stoic explanation of the first puzzle, that is, of why we can see into an illuminated room from the dark, but not in the reverse direction.

The first puzzle

The author of the *Mantissa* ventures, in subsection 4 of section 10, two criticisms against the solution of those who explained vision through the co-tension of the air:

- 1 It does not make sense to claim, Alexander points out, that the illuminated air around the sense object is more easily co-tensioned and registers better the state of the object than the unilluminated one, because the unilluminated air is denser than the illuminated one.
- 2 It does not make sense to claim, Alexander continues, that it makes any difference whether the unilluminated air is adjacent to the sense object or to the perceiver; for if the Stoics thought that the unilluminated air is not as easily co-tensioned as the illuminated one, the perceiver's sight would not be able to co-tension the unilluminated air close to it, and subsequently the illuminated air around the sense object.

Let me look closely at these two arguments. Alexander's first argument presupposes that, since unilluminated air is denser than the illuminated one, it is more easily co-tensioned, but this is not in accordance with the Stoic doctrine concerning the difference between illuminated and unilluminated air. On the contrary, the Stoics seem to have suggested that the presence of light rarifies or disperses the air and thereby enhances its tension; that is to say, it is exactly the fact that the illuminated air is less dense than the unilluminated one that renders

it, according to the Stoics, more easily co-tensioned and thus capable to register better the state of the sense object. The second argument is also problematic, for those who explained vision through the co-tension of the air seem to have claimed that the innate *pneuma* pokes at the surrounding air, and thus co-tensions it, whether it is illuminated or not. On the other hand, the impact of the sense object is simply stamped on the air; if the air is illuminated, it is stamped with strength, since the tension of the perceiver's sight gets stronger being enhanced by light, whereas if the air is unilluminated, the stamp is weak, because the tension of the perceiver's sight is slackened and does not register it. In other words, there may be no difference whether the air around the perceiver is illuminated or not, but it makes a lot of difference whether the air around the sense object is illuminated or not.

The difference becomes even clearer in the case of the early Stoic extramission theory of vision; for the sense object only presses the surrounding air, whereas the *pneuma*, the rays or the gleam emitted from the perceiver's eyes reach out all the way to the sense object, whether the perceiver is surrounded by light or darkness. So, it is not surprising that Calcidius (*ad Tim.* 237 = *SVF* 2.863) explicitly says, as we have seen, that illumination has to be placed near the sense object, in order for it to be perceived. It is indicative, moreover, that the doxographic tradition deals with the Stoic doctrine not in the chapter on vision, but as a reply to the issue whether darkness is visible or not:

Chrysippus says we see by virtue of the stretching of the intervening air. The air is pricked by the visual *pneuma*, which advances from the principal part [of the soul] to the pupil. Upon its impact against the surrounding air the visual *pneuma* stretches the air conically, whenever the air is homogeneous [of the same kind]. Fiery rays, not black misty ones, are poured forth from the sight. Hence darkness is visible.

(*Aëtius*, *Plac.* 4.15.3, 406.4–14 = *SVF* 2.866; *trans.* D. Hahm)²³

Therefore, both arguments against the Stoics' solution to the first puzzle could be regarded as "strawman" arguments since they do not comply with their basic tenets about visual perception. Does Alexander misunderstand the Stoic theory of vision or does he misrepresent it on purpose? There are some remarks in the *Mantissa* text under discussion that betray how Alexander's own stance on these matters blinds his judgment; for instance, his presupposition that dense air is conducive to vision. Still, it is of course quite difficult to settle this issue, especially since the author of the *Mantissa* does not explicitly state his preferred solution to this puzzle.

The Epicurean intromission theory

No other ancient text presents the Stoic explanation of the first puzzle, so it is not even certain whether the Stoics themselves were concerned with it or it is simply Alexander who applies in this particular case their theory of vision, or at least what he takes their theory of vision to be. On the other hand, we do have some evidence that the Epicureans were actually interested in this puzzle, and, what is more, they were confident that their views on visual perception offered a reasonable solution to it. It is unfortunate, though, that the author of the *Mantissa* does not mention this puzzle in the section devoted to the Epicureans, i.e. in section 11, which includes arguments against those who say that seeing comes about through the entry of images (*eidōla*).²⁴ The Epicurean discussion of the first puzzle is found, not among Epicurus' surviving works, but in the fourth book of Lucretius' poem *De rerum natura*:

We see from the darkness things that are illuminated because, when the dark air of the gloom, which is nearer, enters our eyes first and occupies them, being open, hurriedly the bright and clear air follows and as it were cleans them and scatters the black shadows of the former air. For the latter is much more mobile and has smaller particles and more power. As soon as it fills the passages of our eyes with light and lays open those which the dark air had previously blockaded, straight away there follow the images of the things which are situated in the light, and they provoke us to see. On the other hand we cannot do this in darkness from the light, because the gloomy air, which is thicker, follows after [the illuminated air] and fills up all the apertures and blockades to the passages of the eyes, so that they cannot be roused by the images of any things impinging [on them].

(*Lucretius*, *De rerum natura*, 4.337–352; *trans.* R. W. Sharples)²⁵

To understand the Epicureans' position on this issue, let me introduce briefly their theory of vision, which is an intromission theory.²⁶ Epicurus rejected the idea that something extends from the perceiver's eyes all the way to the sense object and held instead that very fine effluences of atoms, in Greek the so-called *eidôla*, and in Latin *simulacra*, are constantly emitted from the surface of objects, reach our sensory apparatus with enormous velocity, and finally affect our visual organs:

One must also believe that it is when something from the external objects enters into us that we see and think about their shapes. For external objects would not stamp into us the nature of their own colour and shape via the air which is between us and them, nor via the rays or any kind of flows which move from us to them, as well as [they would] by means of certain outlines which share the colour and shape of the objects and enter into us from them, entering the vision or the intellect according to the size and fit [of the effluences] and moving very quickly; then, for this reason, they give the presentation of a single, continuous thing, and preserve the harmonious set [of qualities] generated by the external object, as a result of the coordinate impact (*epereismon*) from that object [on us], which [in turn] originates in the vibration of the atoms deep inside the solid object. And whatever presentation we receive by a form of application, whether by the intellect or by the sense organs, and whether of a shape or of accidents, this is the shape of the solid object, produced by the continuous compacting or residue of the image.

(*Epicurus*, *Ep. Herod.* 10.49–50; *trans.* B. Inwood and L. P. Gerson)²⁷

So how did the Epicureans explain, on the basis of their theory of vision, that we can see into an illuminated room from the dark but not in the reverse direction?

Lucretius clearly states that dark air blocks the perceiver's eyes, whereas light, as it were, cleanses them; whichever of the two is the last to enter the eyes determines whether the perceiver is able to see the sense object or not. That is to say, when the perceiver is in a dark room seeing an object in an illuminated room, the passages of the perceiver's eyes are at first filled by darkness;²⁸ afterwards, though, the light from the illuminated room scatters darkness, being more powerful due to its mobile and small particles, so that it is soon followed by the images of the sense objects. On the other hand, when the perceiver is in an illuminated room seeing an object in the dark, darkness comes at the end and blocks the passages of the perceiver's eyes, so that the images of the sense objects cannot enter. But what does Lucretius mean exactly, when he claims that light cleanses the eyes' passages that are filled by darkness? Given that the particles of light are

said to be minute and extremely mobile (Lucretius, *De rerum natura* 4.183–198; cf. also, 2.381–387, 2.795–809 and 6.323–334), and given that darkness is nothing but air devoid of light (Lucretius, *De rerum natura* 4.369), it is reasonable to assume that light particles penetrate into the eyes' passages, push other particles and create space for the images of sense objects. Unfortunately, though, Lucretius' testimony is very scarce and unclear on this topic, and there is no other available evidence on Epicurus' theory of light and darkness.

Moreover, as Bob Sharples (2002: 8) has pointed out, Lucretius' explanation seems to disregard the fact that, if we are in an illuminated room, we cannot see something in the dark but we can still see the illuminated room; darkness does not follow light in the sense that one finishes and the other starts, but rather we go on being aware of both at once. Sharples has also tried to respond, on behalf of the Epicureans, to this possible objection: the processes involved should be understood as discrete in time rather than as overlapping. In other words, the Epicureans could have claimed that, when we look out of an illuminated room, the image we should have is not one simply of darkness replacing light but of a rapid alternation, too fast for us to notice, as first the light within the room enters our eyes, then the darkness outside, and then the whole sequence repeats itself. So, when Lucretius speaks of light driving out darkness and of darkness blocking the eyes' passages, he is simply explaining why each half of the cycle is different from the one that has preceded it.

Ingenious though it may be, Sharples' defense of the Epicurean view is entirely speculative. But there is no doubt that the Epicureans did make an attempt to explain why we can see into an illuminated room from the dark, but not vice versa, and their explanation was consistent with the general principles of their theory of vision, even if it was not completely immune to adverse challenges.

The second puzzle

Having in mind the above analysis of the first puzzle, I can next comment in broad outline on the second puzzle, which is briefly presented by the author of the *Mantissa*, in subsection 5 of its section 10, as follows: "Moreover there are times when, two rooms being opposite [each other] and illuminated, but the air between the two rooms being dark, people see one another from the rooms none the less, although the air between is not co-tensioned. How can this happen?" (*Mantissa* 132.7–10; trans. R. W. Sharples with changes).²⁹

As I have said at the beginning, Alexander gives a brief description of this puzzle right after the puzzle about why we can see into an illuminated room from the dark but not in the reverse direction. This second puzzle, which asks why two people can see one another from rooms that are opposite and illuminated although it is dark between the two rooms, is thus treated by Alexander as another serious threat to the theory of those who explained vision through the co-tension of the air. The passage from the *Mantissa*, however, does not provide us with any clue why its author thinks that this is an unsolvable puzzle for the Stoics, if they are indeed the proponents of this theory. Nevertheless, it is reasonable to assume that, in Alexander's view, since there is darkness between the illuminated rooms of the two perceivers, the air is slackened in such a way that it is impossible for the two perceivers to see each other. But again, just like in the previous puzzle, Alexander's presentation of the Stoics' position does not correspond to what the other ancient sources state about their theory of vision. According to the Stoics, the dark air in the space between the rooms of the two perceivers does not really impede their ability to see each other; for what really matters, in their view, is the fact that the two perceivers, who are at the same time the sense objects of one another, are both surrounded by illuminated air.

Finally, how would the Epicureans have dealt with this second puzzle? It is frustrating that no textual evidence is in the least relevant here, but if we were to apply the reasoning found in Lucretius' poem, the following explanation could be given on behalf of the Epicureans: in the case of the second perceiver being the sense object of the first one, the images from the second perceiver enter the passages of the first perceiver's eyes, because the dark air of the unilluminated space will be followed by the light surrounding the second perceiver, and thus darkness will be scattered by the mobile and minute particles of light; and vice versa in the case of the first perceiver being the sense object of the second one. There is no reason, however, to further elaborate on this, knowing that it is highly speculative.

Conclusion

My aim, here, is not to take sides and defend one solution to these puzzles over the other. Following closely Alexander's text and the other relevant sources, I try to reconstruct the different explanations given by ancient philosophers as well as to examine whether their suggestions are consistent with their theories of vision. For it seems that such puzzles were at the center of debates among the post-Aristotelian philosophical schools, which measured in this manner the explanatory power of their positions concerning visual perception. Interestingly enough, the first puzzle, in particular, is used again many centuries later as an argument against extramission theories and in favor of an intromission theory that shows some affinity, in my view, with the Epicurean doctrine. In the second of his *Solutiones* for Empress Helena Palaiologina, the thirteenth-century Byzantine scholar Nikephoros Gregoras, tried to demonstrate, as he himself says, that vision is not active but passive, just like hearing is.³⁰ More specifically, among the arguments in favor of his intromission theory, Gregoras includes the following (*Sol.* II.101–110):³¹ it is easier for someone to see something in the light when sitting in the dark than to see something in the dark when sitting in the light, because the proceeding rays of light set the images of the things in the light in motion, bringing them forward. It is quite intriguing to search for the texts that may have influenced Gregoras' solution to the first puzzle; for the time being, though, let me simply stress the importance and continued presence of these puzzles in the history of philosophy.

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Notes

- 1 On the *Mantissa* and its author, as well as on the textual evidence and the treatise's division into sections and subsections, cf. the introductions in Sharples' edition (2008) and translation (2004a), as well as Sharples 2004b.
- 2 §10. Πρὸς τοὺς διὰ τῆς τοῦ ἀέρος συνεντάσεως τὸ ὁρᾶν ποιῶντας.
- 3 ἔτι διὰ τί ἐκ μὲν φωτὸς τὰ ἐν σκότῳ ὄντα οὐχ ὁρᾶται, ἐκ δὲ σκότους τὰ ἐν τῷ φωτί; τὸ γὰρ λέγειν τὸν μὲν πεφωτισμένον ἀέρα τῷ διακεκρίσθαι μᾶλλον ἔχειν ἰσχὴν καὶ δύνασθαι τῇ ἐπερείσει τὴν αἴσθησιν κινεῖν, τὸν δὲ ἀφώτιστον τῷ κεχαλᾶσθαι μὴ δύνασθαι ὑπὸ τῆς ὥψεως συνεντείνεσθαι, καίτοι πυκνότερον ὄντα τοῦ πεφωτισμένου, πῶς πιθανόν; τοῦναντίον γὰρ εὐλογον τὸν πυκνότερον

- ῥᾱον συνεντείνεσθαι, ἄλλως τε καὶ τοῦτο πεφυκότεν πάσχειν, ὅποτε ἐκ σκοτεινοῦ τὰ ἐν φωτὶ θεῶτο. εἰ δὲ μὴ ὁ συνάπτων τῇ κόρῃ ἀφώτιστος ὢν ἐντείνεσθαι πέφυκεν, ἀλλὰ μόνον ὁ πεφωτισμένος, τί διαφέρει ἐντεῦθεν ἢ ἐντεῦθεν εἶναι τὸ κεχαλασμένον τοῦ ἀέρος, λέγω δὲ πρὸς τοῦ ὀρωμένου ἢ πρὸς τοῦ ὀρώοντος; εὐλογον γὰρ καὶ ὅταν ἡ ἀφώτιστος ὁ πρὸς τῇ κόρῃ, ὁ δὲ πεφωτισμένος πρὸς τῷ ὀρωμένῳ, ἐκλύεσθαι πάλιν τὸν τόνον τὸν ἀπὸ τῆς ὀψεως ἰόντα πρῶτον διὰ τοῦ ἀφωτίστου ὄντος δυσκινήτου, ἐκλυθέντα δὲ μηκέθ' οἷόν τε εἶναι συνεντείνειν τὸν πεφωτισμένον τὸν πρὸς τῷ ὀρωμένῳ. οὐδὲν γὰρ μᾶλλον ἔδει τὰ ἐν τῷ φωτὶ ὑπὸ τῶν ἐν τῷ σκότῳ ὀρᾶσθαι ἢ τὸ ἔμπαλιν. On lines 131.33–34, I do not follow Ivo Bruns' suggestion "τὸν δὲ ἀφώτιστον τῷ <μὴ> κεχαλαῶσθαι μὴ δύνασθαι," nor Bob Sharples' suggestion "τὸν δὲ ἀφώτιστον [τῷ] κεχαλαῶσθαι <τῷ> μὴ δύνασθαι" (and, therefore, his translation "while what is unilluminated is slackened because it cannot be tensioned by sight"), but I keep the manuscript reading: τὸν δὲ ἀφώτιστον τῷ κεχαλαῶσθαι μὴ δύνασθαι.
- 4 Bob Sharples (2004a: 98–99; 2008: 187) rightly points out that section 10 does not have any close parallels in Alexander's commentary on Aristotle's *De sensu*. However, I find his explanation rather weak ("the theory is post-Aristotelian, and Alexander does not choose to introduce it into his discussion of Aristotle's text"), since there are many passages in this commentary where Alexander chooses to refer to post-Aristotelian doctrines.
 - 5 Εἰσὶν δὲ τινες, οἱ διὰ τῆς τοῦ ἀέρος συνεντάσεως τὸ ὀρᾶν φασὶ γίνεσθαι. νυττόμενον γὰρ ὑπὸ τῆς ὀψεως τὸν συνάπτοντα τῇ κόρῃ ἀέρα σχηματίζεσθαι εἰς κῶνον. τούτου δὲ οἷον τυπουμένου κατὰ τὴν βάσιν ὑπὸ τῶν ὀρατῶν τὴν αἴσθησιν γίνεσθαι, καθάπερ καὶ τῇ ἀφῇ διὰ βακτηρίας.
 - 6 See, for instance, Galen, *De Hipp. et Plat. plac.* 7.7.20, 474.8–12 De Lacy; Diogenes Laertius 7.157 = *SVF* 2.876; Calcidius, *ad Tim.* 237 = *SVF* 2.863.
 - 7 On Plato's theory of vision, cf. Ierodiakonou 2005.
 - 8 On the stretching of the soul's innate *pneuma* to the eyes, and in general to the sense organs, cf. von Staden 1978.
 - 9 See also, Epictetus, *Diss.* 3.3.20–21.
 - 10 εἰκῇ οὖν σοι ὁ θεὸς ὀφθαλμοὺς ἔδωκεν, εἰκῇ πνεῦμα ἐνεκέρασεν αὐτοῖς οὕτως ἰσχυρὸν καὶ φιλότεχνον, ὥστε μακρὰν ἐξικνούμενον ἀναμάς<ς>εσθαι τοὺς τύπους τῶν ὀρωμένων; <καὶ> ποῖος ἄγγελος οὕτως ὠκὺς καὶ ἐπιμελής;
 - 11 μείζονος δὲ αὐτοῦ καὶ ἐλάττονος φαινομένου ἡμῖν, καὶ ὁμοίως τῶν κατ' αὐτὸν διαστημάτων μειζόνων τε καὶ μειόνων, ὁ κατ' ἀλήθειαν ἐπιβάλλων αὐτῷ κῶνος ἀπὸ τῶν ἀποχεομένων ἀκτίνων <ἀπὸ> τῆς ὀψεως μέγιστός ἐστιν ἀναγκαίως.
 - 12 <Stoici> vero videndi causam in nativi spiritus intentione constituunt, cuius effigiem coni similem volunt. Hoc quippe progressu ex oculorum penetrati, quod appellatur pupula, et ab exordio tenui, quo magis porrigitur, in soliditatem opimato exordio, penes id quod videtur locatam fundi omnifariam dilatarique visus inlustrationem.
 - 13 ὀρᾶν δὲ τοῦ μεταξὺ τῆς ὀράσεως καὶ τοῦ ὑποκειμένου φωτὸς ἐντεινομένου κωνοειδῶς, καθά φησι Χρύσιππος ἐν δευτέρῳ τῶν Φυσικῶν καὶ Ἀπολλόδωρος. γίνεσθαι μέντοι τὸ κωνοειδὲς τοῦ ἀέρος πρὸς τῇ ὀψει, τὴν δὲ βάσιν πρὸς τῷ ὀρωμένῳ· ὥς διὰ βακτηρίας οὖν τοῦ ταθέντος ἀέρος τὸ βλεπόμενον ἀναγγέλλεσθαι.
 - 14 On the Stoic theory of vision, cf. Sambursky (1959: 22–27); Todd (1974); Løkke (2008: 37–39).
 - 15 On Galen's criticism of the Stoic theory as well on Galen's own theory of vision, cf. Ierodiakonou 2014.
 - 16 See also, Galen, *De Hipp. et Plat. plac.* 7.4.24–25, 452.22–28; 7.5.41, 460.28–33; 7.7.20, 474.8–12 De Lacy.
 - 17 τὸ δὲ ὀπτικὸν οὐχ οἷόν τε τοσαύτην ῥύσιν ἐκτεινόμενον λαμβάνειν ὥς περιχεῖσθαι παντὶ τῷ βλεπόμενῳ σώματι· τοῦτο γὰρ ὁμοίον ἐστὶ τῷ τῶν Στωϊκῶν σταλαγμῷ κεραννυμένῳ τῇ πάσῃ θαλάττῃ.
 - 18 λείπεται οὖν ἔτι τὸν περίξ ἀέρα τοιοῦτον ὄργανον ἡμῖν γίνεσθαι καθ' ὃν ὀρῶμεν χρόνον, ὁποῖον ἐν τῷ σώματι τὸ νεῦρον ὑπάρχει διὰ παντός. τοιοῦτον γάρ τι πάσχειν ἔοικεν ὁ περιέχων ἡμᾶς ἀήρ ὑπὸ τῆς τοῦ πνεύματος ἐκπτώσεως, ὁποῖόν τι καὶ πρὸς τῆς ἡλιακῆς αὐγῆς. ἐκείνη τε γὰρ ψαύουσα τοῦ ἄνω πέρατος αὐτοῦ διαδίδωσιν εἰς ὅλον τὴν δύναμιν, ἢ τε διὰ τῶν ὀπτικῶν νεύρων ὀψις φερομένη τὴν μὲν οὐσίαν ἔχει πνευματικὴν, ἐμπίπτουσα δὲ τῷ περιέχοντι καὶ τῇ πρώτῃ προσβολῇ τὴν ἀλλοίωσιν ἐργαζομένη διαδίδωσιν ἄχρι πλείστου, συνεχοῦς αὐτῷ δηλονότι τοῦ περίξ σώματος ὑπάρχοντος, ὥς ἐν ἀκαρεῖ χρόνῳ τὴν ἀλλοίωσιν εἰς ὅλον αὐτὸ διαπέμπειν.
 - 19 It is interesting to note, here, the use of the Greek noun *epereismos* in Epicurus' letter to Herodotus (10.50.3; 66.11), where it denotes the impact of an external object on our senses.
 - 20 *Mant.* 130.22; 26; 26; 30; 131.22; 33; 132.14; 32; 33; 133.5; 7; 10; 11; 134.4; 25; 27.
 - 21 There is only one passage in Proclus' commentary on Plato's *Parmenides* (841.1–6), in which the term *epereisis* occurs in the context of the Stoic theory of perception, but even in this case it is not necessary

- to assume that the use of this term should be attributed to the Stoics: Τὸ δεύτερον τοίνυν ὁ τῆς σφραγίδος τύπος Στωϊκῶν ὑποθέσσει προσήκει ταῖς σωματικῶς λεγούσαις τὰ ποιοῦντα ποιεῖν καὶ τὰ πάσχοντα πάσχειν· ὠθισμοῦ γὰρ δεδέχεται καὶ ἀντιτυπίας καὶ ἐπερείσεως καὶ οὐκ ἄλλως γέγονεν.
- 22 See, for instance, Galen, *De anat. admin.* II 387.17 Kühn; *Syn. puls.* IX 449.8 Kühn; *De comp. med.* XIII 950.8 Kühn; *De humero* XVIIIa 387.6 Kühn.
- 23 Χρύσιππος κατὰ συνέντασιν [τὰ ὄντα] τοῦ μεταξὺ ἀέρος ὁρᾶν ἡμᾶς, νυγέντος μὲν ὑπὸ τοῦ ὀπτικοῦ πνεύματος, ὅπερ ἀπὸ τοῦ ἡγεμονικοῦ μέχρι τῆς κόρης διήκει, κατὰ δὲ τὴν πρὸς τὸν περικείμενον ἀέρα ἐπιβολὴν ἐντείνοντος αὐτὸν κωνοειδῶς, ὅταν ἦ ὁμογενὴς ὁ ἀήρ. προχέονται δ' ἐκ τῆς ὀψεως ἀκτῖνες πύριναι, οὐχὶ μέλαιναι καὶ ὀμιχλώδεις· διόπερ ὁρατὸν εἶναι τὸ σκότος.
- 24 §11. Πρὸς τοὺς διὰ τῆς τῶν εἰδώλων ἐμπτώσεως τὸ ὁρᾶν λέγοντας γίνεσθαι.
- 25 E tenebris autem quae sunt in luce tuemur
propterea quia, cum propior caliginis aer
ater init oculos prior et possedit apertos,
insequitur candens confestim lucidus aer,
qui quasi purgat eos ac nigras discutit umbras
aeris illius; nam multis partibus hic est
mobilius multisque minutior et magis pollens.
qui simul atque vias oculorum luce replevit
atque patefecit quas ante obsederat aer
ater, continuo rerum simulacra sequuntur
quae sita sunt in luce, lacessuntque ut videamus.
quod contra facere in tenebris e luce nequimus
propterea quia posterior caliginis aer
crassior insequitur, qui cuncta foramina complet
obsiditque vias oculorum, ne simulacra
possint ullarum rerum coniecta movere.
- 26 On the Epicurean theory of vision, cf. Lee (1978); Hahm (1978).
- 27 Δεῖ δὲ καὶ νομίζειν ἐπεισιόντος τινὸς ἀπὸ τῶν ἔξωθεν τὰς μορφὰς ὁρᾶν ἡμᾶς καὶ διανοεῖσθαι· οὐ γὰρ ἂν ἐναποσφραγίσαιτο τὰ ἔξω τὴν ἐαυτῶν φύσιν τοῦ τε χρώματος καὶ τῆς μορφῆς διὰ τοῦ ἀέρος τοῦ μεταξὺ ἡμῶν τε καὶ κείνων, οὐδὲ διὰ τῶν ἀκτίνων ἢ ὠνδήποτε ρευμάτων ἀφ' ἡμῶν πρὸς ἐκεῖνα παραγινομένων, οὕτως ὥς τύπων τινῶν ἐπεισιόντων ἡμῖν ἀπὸ τῶν πραγμάτων ὁμοχρόων τε καὶ ὁμοιομόρφων κατὰ τὸ ἐναρμόττον μέγεθος εἰς τὴν ὄψιν ἢ τὴν διάνοιαν, ὡκέως ταῖς φοραῖς χρωμένων, εἴτα διὰ ταύτην τὴν αἰτίαν τοῦ ἐνὸς καὶ συνεχοῦς τὴν φαντασίαν ἀποδιδόντων καὶ τὴν συμπάθειαν ἀπὸ τοῦ ὑποκειμένου σωζόντων κατὰ τὸν ἐκεῖθεν σύμμετρον ἐπερισμὸν ἐκ τῆς κατὰ βάθος ἐν τῷ στερεμνίῳ τῶν ἀτόμων πάλλσεως. καὶ ἦν ἂν λάβωμεν φαντασίαν ἐπιβλητικῶς τῇ διανοίᾳ ἢ τοῖς αἰσθητηρίοις εἴτε μορφῆς εἴτε συμβεβηκότων, μορφὴ ἐστὶν αὕτη τοῦ στερεμνίου, γινομένη κατὰ τὸ ἐξῆς πύκνωμα ἢ ἐγκατάλειμμα τοῦ εἰδώλου.
- 28 I agree with Godwin (1986: 113) and Sharples (2002: 7) that on line 344 the passages of the eyes (*vias oculorum*) are the passages in the eyes and not the way to the eyes, as Bailey (1947: 3.1223) has previously interpreted this text.
- 29 ἔτι ἔστιν, ὅτε δύο οἰκημάτων καταντικρὺ ὄντων καὶ φῶς ἐχόντων, τοῦ δὲ μεταξὺ τῶν οἰκημάτων ἀέρος σκότος ἔχοντος, οὐδὲν ἦττον ἀλλήλους ὁρῶσιν ἐκ τῶν οἰκημάτων, καίτοι τοῦ μεταξὺ μὴ συνεντεινομένου ἀέρος. πῶς οἶόν τε τοῦτο συμβαίνει;
- 30 On Gregoras' theory of vision, cf. Bydén (2003: 208–209).
- 31 Ἴσμεν γὰρ ὥς οἷς ἐν σκότει καθῆσθαι συμπίπτει, πολλάκις τούτοις ἀπλανῶς καὶ πόρρωθεν βλέπειν περίεστι τοὺς ἐν φωτί, οἷς δ' ἐν φωτί, τούτοις δὲ τὸναντίον ἥκιστα πάντων ὁρᾶν τοὺς ἐν σκότει. Αἴτιον δ' ὅτι αἱ τῶν τοῦ φωτὸς ἀκτίνων ἀποχεόμεναι πρόοδοι κινουσι μὲν καὶ τὰς τῶν ἐν αὐτῷ τῷ φωτί καθημένων εἰκόνας καὶ προωθοῦσιν ἐπὶ τὴν πρόσω καὶ διαμέτρου θέσιν κινουσι δ' οὖν καὶ τὰς τῶν μεταξὺ κειμένων πραγμάτων ὁποῖά ποτ' ἂν εἴη καὶ ὅποσα ἐκεῖνα πάσας ὁμοῦ καὶ ἀχρόνως εἰπεῖν ἀναματτόμεναι τὰς ἐκείνων εἰκόνας ὥς ἔτυχον ἔχοντα θέσεώς τε καὶ τάξεως.

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5

PLOTINUS ON PERCEPTION

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It is difficult to imagine that there is an account of the interaction of the physical with the mental that has not yet been mapped out in the existing (vast!) philosophical literature on the mind–body problem, and that would be new to us. Yet this is what I will argue is the case with Plotinus’ account of perception. He develops his innovative metaphysical position to explain the possibility of causal interaction between entities that he recognizes to be categorically different, and causally inert toward each other—the soul and the body—and then applies his original account to solve the problem of how our soul can perceive external objects. In this essay, I will focus on Plotinus’ account as given in *Ennead* IV; from a detailed textual analysis of some sections of this book I will draw more general conclusions concerning his theory of perception.

The soul and the objects of perception

In *Ennead* IV.4.23, Plotinus states his theory’s explanandum: in perception, our soul becomes aware of the sensible qualities of physical objects in the world. The question that exercises Plotinus is: *how* does the soul do so? He develops a complex argumentation which shows that the soul needs to be embodied, if it is to be able to perceive items in the natural world: “it is clear that sense-perception belongs to the soul in the body and working through the body” (IV.4.23.48–49). Plato too had assumed, in the *Theaetetus*, that perception takes place through the body but did not develop any metaphysical argument to show why this has to be so. I submit that Plotinus sees himself as supplying such an argument.

Interestingly, he begins his investigation into how the soul perceives the qualities of external objects without presupposing the necessity of the soul’s embodiment: “We must suppose that the perception of sense-objects is for the soul, or for the living being an act of apprehension, in which the soul comes to know the quality attaching to bodies and takes the impression of their forms” (IV.4.23.1–4, translation modified).

There are two explanatory challenges stated in this passage. The first concerns how the soul can interact with physical objects, the second how the soul can identify the objects it interacts with, thus becoming aware of them. To address these challenges, Plotinus begins by examining the state of the soul. He introduces a dichotomy concerning the soul: “the soul will either apprehend alone by itself, or in company with something else” (IV.4.23.4–5). The

argument that follows aims to address this question: which of the two states the soul needs to be in, in order to be able to perceive the world. First, Plotinus considers the possibility that the soul is by itself, when it perceives objects, and denies it: “But how can it do this [perceptual apprehension of objects] when it is alone and by itself? For when it is by itself it apprehends what is in itself, and is pure thought” (IV.2.23.4–6). Why would this be the case? Why would the soul, when by itself, apprehend only what is in itself, pure thought, and not the external world?

The thought might be that the soul, when by itself, cannot turn its attention to anything other, just like Aristotle’s “divine soul,” the unmoved mover. The unmoved mover is essentially a self-thinker; namely, it is incapable of thinking about anything other than its own particular act of thinking, which comprises it, as we know from *Metaphysics* XII. Given that Aristotle’s account of the unmoved mover was known to Plotinus, his questioning in disbelief whether a soul, by itself, could apprehend other objects, seems to make sense. But upon scrutiny his claim cannot stand on its own as self-evident, as if in need of no further justification; for example, why can the soul not think¹ of the One, which is not contained in the soul?² Plotinus does consider, as a next step in his argument, the possibility that even a soul that is by itself could turn its attention to things other than itself, *if certain conditions are satisfied*: “If it [the soul] also apprehends other things, it must first have taken possession of them as well, either by becoming similar to them, or by conjoining with something which has become similar” (IV.4.23.6–7, translation modified).

So we find out that the Plotinian soul is not so Aristotelian as to be incapable of other-thinking. It is capable of self-thinking, just as Aristotle’s unmoved mover is, but it may also satisfy one of the conditions for becoming able to think of other entities, too. Plotinus posits two conditions for other-thinking, the second of which will require our close scrutiny for its metaphysical interest. (We will come to it in the section “The Ontological Intermediary: The Sense Organs.”) The first condition, the obtaining of which allows the soul to become aware of things other than itself, is that the soul become similar to them. Becoming similar to the object of perception, e.g., this chair, is presented by Plotinus as a necessary condition for perception and appears in both requirements stated in the passage here above for perceiving to be possible. The reason must be that becoming similar to the objects of awareness is the soul’s mechanism for, in Plotinus’ words, “taking possession” of them. I take Plotinus to mean that this is how the soul “grasps” the objects that it perceives. It is a cognitive grasping that secures that a perceptual awareness is about the object that causes it, by having something of the object, its form, present in the content of the awareness.

The idea of positing this condition must derive from Aristotle, who famously defined perception as the reception by the sense organ of the form of the object, which, then, grounds the identification of the external object in perception.³ Thus, receiving in perception the form of the chair in the room enables one to identify the chair. Can the soul for Plotinus become similar to external physical objects, when the question is to be understood in the light of Aristotle’s view, as: can the soul receive in some way their forms, i.e. their qualities? Plotinus’ argumentation concerning this issue becomes complex if not convoluted, and we need to tread carefully, step by step. He (ex-)claims: “But it [the soul] cannot become similar to them [to the external objects of perception] while it remains by itself” (IV.4.23.8–9). That is, the soul cannot become similar to physical objects if it is by itself, even if it can turn its attention to something other than itself. Plotinus then proceeds to provide a justification of this claim, in terms of the categorical difference between the soul and the external objects. I turn to this issue in the next section.

Categorical difference

How does Plotinus understand categorical difference? To begin, we need to note that Plotinus alludes to categorical difference in order to show that the soul cannot become similar to a physical object. Hence, we would expect that one of the defining differences between different categories of being would be for him that the items of one category cannot resemble the items of another category. This expectation is enhanced by the justification that Plotinus provides in the passage that immediately follows, to support the claim that the soul cannot come to resemble physical objects, while it remains by itself. Plotinus explains: “For how could a point be assimilated to a line?” (IV.4.23.9–10). This is right; the point, *qua* dimensionless, is a categorically different entity from a line, which is a one-dimensional entity, and something dimensionless cannot resemble a one-dimensional entity.

This is a powerful justification (by example) of the claim that categorically different entities cannot resemble one another. Yet, Plotinus’ second example comes as a surprise: “For even the intelligible line would not fit the sensible one, nor would the intelligible fire or man fit the sense-perceived fire or man” (IV.4.23.10–12). Here we encounter a problem: the intelligible line *does* resemble the sensible one, because they are both one-dimensional; however, they are also categorically different, the one being mental and the other physical. Hence, Plotinus *cannot* use this example as evidence to show that categorically different items cannot resemble one another, and hence to show that the soul, by itself, cannot perceive external objects by becoming similar to them, as would be required for perception. Unraveling the puzzle generated by this incongruous example will give us an important insight into what categorical difference is for Plotinus.

Although Plotinus has been claiming until this point in the argument that categorically different items *cannot resemble* one another, giving the point and the line example and then the mental and the physical lines example, it is hard to imagine that he did not realize that the two lines in his second example *do resemble* one another by both being one-dimensional. There is evidence that Plotinus did indeed realize this difference in his examples, because, although throughout this argument he has been using the term “resembling” (ὁμοιωθεῖναι), he suddenly changes verbs in the example of the mental and physical lines, telling us, not that they cannot *resemble* one another, but that they cannot *fit with* (ἐφαρμόζειν) one another. This is a surprising switch in terminology, which changes the criterion so far given for categorical difference, from the impossibility of resembling to the impossibility of fitting together. The same verb is to be understood as repeated in the subsequent example in the same sentence, that of the Forms of Man or Fire versus the sensible man and fire. Working out what it means for the Form of Fire not to fit with a physical fire leads us to see that Plotinus focuses now on the categorial difference between being and not being in space-time: what is in space-time belongs to one category, and what is not, to a different category.⁴ Can this be generalized into a criterion of categorical difference? Is the difference between the items of distinct categories always a difference concerning the “spaces” they are in, so that they cannot fit with each other? What of the difference between, for example, fire and honesty? Even if they were per hypothesis both conceived of empirically, their mutual fit would not never be a factor that accounts for their categorial difference.

I will not consider whether location in space is a factor that accounts for the categorial difference between soul and body for Plotinus since he never mentions it explicitly in his arguments concerning the difference between soul and body, as we will see in what follows. I have nevertheless a speculative explanation to offer for why Plotinus switches from the possibility of resembling to that of fitting with, as a criterion for categorial sameness. His

thought might be that if two things cannot fit with each other because they are not in the same space, they cannot be in contact, which Aristotle had thought to be necessary for causal interaction (*Physics*, 202a5–9). So Plotinus might be talking of fit, in his second and third example of categorically different items, to anticipate propedeutically the question of which conditions do enable causal interaction. The impossibility of direct causal interaction between the soul and its objects of perception is the next theme in Plotinus' argument.

So far, the argument has explored certain impossibilities concerning the interaction between categorially different items. It appears that the soul cannot become similar to external objects, or, that its nature is incongruous enough with the natures of the external objects that the soul cannot possess something of them, through which it would apprehend (ἀντιλήψεται, IV.4.23.6) these objects. The argument now changes direction, without warning to the reader: it began as a search for the means by which the soul could grasp external objects (e.g., by coming to resemble them) and now turns into an investigation of whether the soul can communicate *at all* with external objects, which seemed to have been previously assumed as possible by Plotinus. The assumption that the soul cannot perceive without grasping the external objects in some way or other, for identification purposes, remains in place all along. So, along with exploring the possibility of communication between the soul and the objects, Plotinus continues investigating how such communication would also facilitate alternative ways in which the soul could “grasp” external objects, without becoming similar to them.

At this point, Plotinus leaves the examples and returns to the argument with a further explication of the problem:

But when the soul is alone, even if it is possible for it to direct its attention to the world of sense [as per hypothesis], it will end with an understanding of the intelligible; what is perceived by sense will escape it, as it has nothing with which to grasp it.

(IV.4.23.14–15)

This is a clear statement of the issue: the soul lacks the means by which to become sensitive to the presence and characteristics of physical objects. The problem as stated here is not turning the soul's attention away from its own thinking activity toward the objects in the world (as it would be with a soul like the Aristotelian unmoved mover, which can think only of its own thinking). The Plotinian soul, alone by itself, could turn its attention away from itself, but its effort would be frustrated in relation to external objects, because it has no means of accessing them and registering them. This is the problem. What does this tell us about the essential nature of the soul, as Plotinus conceives of it? The soul can cognize objects of thought other than itself; specifically, it can think about items in the intelligible realm, and comprehend them. What the soul does not possess is a “mechanism” for attending to anything outside the intelligible realm. The problem at this point is not the nature of such objects and their suitability for being objects of cognition. Plotinus allows for the possibility that the soul directs its attention to the sensible objects; but the problem is that the soul lacks the capacity to register their presence and their qualities. When Plotinus writes, in the passage here above, that “what is perceived by sense will escape it,” he means that physical stimulations of the body from the environment would leave the soul unaffected.

So, finally Plotinus tells us why the soul, alone by itself, cannot perceive physical objects, even if can turn its attention to physical objects: “There cannot, then, be nothing but these two things, the external object and the soul: since then the soul would not be affected” (IV.4.23.19–20). This leaves us with two problems, due to the categorical gap between soul

and objects: the soul is too different from objects; and the soul is impervious to objects. First, the soul cannot “grasp” or “contact” the external objects, either by becoming similar to them and thereby having something of them, or by being congruous enough with them for such contact to take place. Second, the soul has no “mechanism” for being causally affected in any way by these objects when it is by itself. Importantly, Plotinus does not tell us that the soul cannot be affected by external objects. Neither its categorical difference from objects nor its causal imperviousness to objects entail that the soul cannot be affected, and hence cannot perceive objects. Rather, I submit, what the qualifications Plotinus has made throughout the argument show is that the causal route from external object to the soul is not a “proper” one. Therefore, the quest for an account of perception becomes a quest for how a “proper” causal route from external object to soul can be established, which becomes at the same time a quest for how to overcome their categorical difference.

The ontological intermediary: the sense organs

As we saw, there cannot be only the soul and the external objects; if perception is to take place there has to be a “proper” causal link between them. Plotinus abandons the supposition that the soul can perceive alone by itself and begins exploring alternative routes through which the soul could establish appropriate connections with external objects that would overcome their categorical difference such as to deliver perception of them. The only viable alternative for Plotinus, given that soul and objects cannot interact directly with each other, appears to be that the soul and the objects interact in perception through an intermediary: “There cannot, then, be nothing but these two things, the external object and the soul: since then the soul would not be affected; but there must be a third thing which will be affected, and this is that which will receive the form” (IV.4.23.19–21). This brings us to Plotinus’ metaphysical innovation.

The challenge is formidable. The soul cannot be affected directly by physical objects and so perceive them in this way. The blocking factor is that the soul and the physical objects are categorically different, which does not allow for a direct causal interaction between them. What Plotinus has argued so far is that categorically different items cannot resemble one another; and they cannot be fitted to each other; and they cannot interact causally with each other. So his innovation will be to *reduce the categorical gap by half*, positing a type of entity which is, primitively, ontologically intermediate between categorically different entities. The intermediaries are assumed to facilitate causal interaction between the extremes, thus bridging the categorical gap, and they are the sense organs:

For since it is the organ of a kind of knowledge, it must not be the same either as the knower or what is going to be known, but suitable to be assimilated [ὁμοιωθεῖναι] to each, to the external object by being affected, and to the internal knower by the fact that its affection becomes form.

(IV.4.23.29–32)

The concept of “ontological intermediary” is unfamiliar to us modern thinkers.

Nevertheless, the notion was first introduced by Plato, with the ontological status of numbers. Aristotle reports that for Plato: “Besides sensible things and Forms he [Plato] says there are the objects of mathematics, which occupy an intermediate position, differing from sensible things in being eternal and unchangeable, from Forms in that there are many alike, while a Form itself is in each case unique” (*Metaphysics*, I.6, 987b).

The passage explains the sense in which the objects of mathematics, say numbers, are intermediate entities for Plato. They are intermediate between the Forms and the physical objects, in so far as they share some of their features with the Forms, e.g., being eternal, and some of their features with the objects, e.g., there being many of a kind, by contrast to Forms which are unique per kind. This seems to be a conception of intermediate, as we will see, which Plotinus employs in his account of perception.

In the *Phaedo*, Plato does describe an intermediate entity between body and soul—the desiderative part of the soul—thus anticipating Plotinus’ move but with a more naive conception: “But it [i.e. the soul] will be interpenetrated, I suppose, with the corporeal which intercourse and communion with the body have made a [desiderative] part of its nature, because the body has been its constant companion and the object of its care?” “Certainly” (81c).⁵

For Plato, the intermediate desiderative part of the soul is generated by interpenetration, intercourse, and communion of the soul and the body. This does require causal interaction between them (which shows that Plato reified the soul as a causal agent and did not hesitate to posit causal interaction between the soul and body), but it is unclear what their combination is, ontologically: whether they are only intimately compresent, or whether some type of fusion is achieved. In what follows, I will argue that Plotinus’ position actually requires a more sophisticated conception of “ontological intermediate” than Plato’s one.

For Plotinus, the intermediary between the soul and the objects is not, constitutionally, an amalgam, such as, e.g., the amalgam of a ferromagnetic metal and aluminum, which makes their combination, the alloy, magnetic. The alloy is magnetic because a constituent of it is magnetic. The aluminum is not magnetic, and it survives along with the ferromagnetic metal in the alloy. So when the alloy responds magnetically to another magnet, its aluminum component does not respond to that magnet. This is *not* how the intermediary between the soul and the objects is constituted, for Plotinus. The sense organs must be a *mean*, whose nature is in between being a “receptor” in relation to the physical and being a “transmitter” in relation to the intelligible. But how is this possible?

As the text above shows, Plotinus assumes that the causal intermediary has to be *similar* to both the soul and the external objects, in order to allow interaction between them. So, Plotinus reasons: “It [the sense organ] must be this which is affected and the other principle [i.e. the soul] which knows [what affected it]; and its affection must be of such a kind that it retains something [physical] of that which produced it, but is not the same as it” (IV.4.23.22–25).

To be similar to the categorically different beings of which it is the intermediary, the intermediary has to bear properties that make it similar to both:⁶ sensible and intelligible properties. Thus, the intermediary is in a midway condition between the two. This condition is described by Plotinus thus:

But as it is between the producer of the affection and the soul, it must have an affection which lies between the sensible and the intelligible, a proportional mean somehow linking the extremes to each other, with the capacity both of receiving and of transmitting [form], suitable to be assimilated to each of the extremes.

(IV.4.23.25–29)

Eyjólfur Kjalar Emilsson, among the contemporary scholars of Plotinus, has suggested that the intermediate affection mentioned in the text above is to be understood as “the phenomenal appearance of colors in the visual field” (2008: 28–29; but see also 1988 and 1996).

This is a sound redescription of what Plotinus says; but it only clarifies the explanandum, rather than providing the explanans. To understand Plotinus' position, we need to investigate the ontology of the sense organs. Emilsson describes the affection which is intermediate between the sensible and the intelligible as follows: "the quality the sense organ takes on is the quality of the object but in a hybrid mode of being in between the corporeal and the intelligible, having some features in common with each" (1996: 219).

As we will see, this leaves open, in Plotinus, the question of the nature of the hybrid mode of the quality (to use Emilsson's term). I will argue that Plotinus develops a sui-generis metaphysical conception of the constitution of a sense organ, which enables the sense organ to be an intermediary substratum of two activities: receiving the form of a physical object and conveying of the form to the soul. I will explain, from Plotinus' own perspective, the metaphysical model that he must be implying here, which I submit combines elements from Plato's theory of intermediate types of entity, Aristotle's theory of perception, and Aristotle's theory of mixture.

Plato's influence on Plotinus's account of perception

We saw that the claim that the intermediary exhibits some properties of each of the extremes is found in Plato's treatment of mathematical objects, such as numbers. However, this claim alone is not sufficient to resolve the problem; consider a mixture of barley and lentil, or the alloy discussed before: such mixtures exhibit some properties of each of the ingredients, but are not intermediate between them,⁷ in the sense that Plotinus needs for his argument: if Plotinus' intermediary were like such mixtures, the categorical difference between the extremes would be retained and replicated in it. It takes more than the compresence of the two kinds to generate an intermediary between the two. This is why I find Emilsson's suggestion of "a hybrid mode of being between the corporeal and the intelligible, having some features in common with each" wanting, in so far as it does not tell us how a hybrid would achieve intermediacy rather than mere compresence of "features in common with each" of the extremes.

Plotinus expresses his metaphysical view extremely briefly. He writes: "This [third thing, the intermediary] must be able to assume the modifications [of the physical object] so as to resemble it, and it must be of one matter" (IV.4.23.22–23; translation modified).⁸ Before discussing his position, I should note that Plotinus' language at this point becomes very Aristotelian. He says of this third thing that it receives the form (μορφήν δεξόμενον) of the object; he talks of its matter (ὕλη); he describes the affection (πάθος) as a proportional mean linking the extremes (μέσον ανάλογον, συνάπτον τὰ ἄκρα ἀλλήλοις); and so forth. I will argue that Plotinus' ontology, too, is built on the Aristotelian metaphysics of mixture.

We saw that Plotinus tells us in the texts above that the intermediary must be able to be causally *affected* by the sensible properties of objects in the world; to be qualitatively *similar* to both the objects and to the soul; and to be *of one matter*. I take it (by inference to the best explanation) that the latter requirement is what *explains* how the intermediary is intermediate between the two. Plotinus' thought, I submit, is that the type of matter of which the intermediary is constituted enables it to bear properties that make it like the soul and like the sensible objects, *because* the matter that makes up the intermediary can take on both intelligible and sensible forms—forms of the soul and forms of physical objects (e.g., phenomenal blue). However, the intermediary is *of one matter*. Which kind of matter can serve as the substratum of categorically different properties? The passage quoted above, where Plotinus talks of the intermediary in terms of being a proportional

mean, gives us a clue from which we can reconstruct Plotinus' thinking. The matter in question, I submit, is conceived by Plotinus as a special type of mixture of the sensible and the intelligible. What type of mixture can this be?

We have seen that the intermediary is not of one matter in the sense of being a heterogeneous mixture constituted (literally, containing) two categorically different elements, analogous to our examples of a mixture of barley and lentils, or an alloy. This would be mixture by juxtaposition only, and although it would have qualities of both mixants, it would do so only by virtue of containing parts of both of the extremes. Plotinus does not consider explicitly in the text the possibility of mixture by juxtaposition, but he does reject the identity of the sense organ to either of the extremes. Furthermore, there are evident reasons why such a compound would not deliver the solution Plotinus wants. A heterogeneous mixture of intelligible stuff and physical stuff would replicate the categorical problem that such a mixture was posited to solve. No progress is made toward bridging the categorical divide by building a bridge juxtaposing (unbridgeable) categorically different building-blocks. I therefore take ὅλης μιᾶς to refer to matter of *one kind*, that is, a homogenous mixture, which is a *tertium quid* in relation to physical-stuff and mental stuff, but intermediate and assimilable to both. The advantage of this is that Plotinus can keep the body and the soul as categorically different types of entity, which he wants, as we see at IV.7.8[2] (Chiaradonna 2005). He wants this so that the nature of soul is not compromised⁹ when in a human. Instead, he ingeniously makes *only* the intermediary intermediate in nature, in between the two types of substance, body and soul, without positing that either the soul or the body change when the soul is embodied.

The mechanism of perception

Plotinus states that this intermediate third thing between the object and the soul has “the capacity both of receiving and transmitting [form]” (IV.4.23.26–27). How is this possible? How does the sense organ achieve this metaphysical feat of receiving from the physical and transmitting to the mental? Plotinus offers an explanation which is itself in need of a metaphysical account. He writes that the sense organ is: “a proportional mean somehow linking the extremes to each other [...] suitable to be assimilated to each of the extremes” (IV.4.23.25–28).

The extremes are the soul and the external objects. However, I wish to note that a proportional mean, “2/3” for instance, links the extremes, not only by expressing the relation between them; it links the extremes by being able to reproduce them. Thus, 2/3 links 10 and 15 by expressing their ratio, 10/15; but also, by being able to reproduce 10/15 by multiplying 2/3 by 5. This is how a proportional mean links the extremes while being apt to assimilation to each. Plotinus proceeds to explicate what he means by “assimilation” in the case of the sense organs; they are: “suitable to be assimilated to each, to the external object by being affected, and to the internal knower by the fact that its affection becomes form” (IV.4.23. 29–31). I take it that Plotinus' point is that the form of the physical object is proportionately reproduced in the perceptual process as a form that it transmitted to and is ineligible to the soul.

We have examined Plotinus' explanation of the function of the sense organ and the nature of its affection in terms of the notions of the “proportional mean” and of the “assimilation to the extremes.” Although this has been informative regarding what Plotinus considers the function of the sense organ to be, it still does not tell us *how* the organ achieves the “assimilation to the extremes.”¹⁰ By which mechanism is the physical form of the external object, which affects the sense organ, converted into information which is transmitted to the soul by the sense? I turn now to describe what I take to be such mechanism, which I reconstruct from Plotinus' stipulation that the sense organ is of “one matter.”

Plotinus' perceptual intermediary

Let us begin with the challenge facing Plotinus' account of perception. From the start, he stated that perception of an external object can be achieved if the perceiver gains access to something of the object, namely, "grasps" the object (so that the perceptual content is about *this* object). As we saw, he writes: "If it [the soul] also apprehends other things [than itself], it must first have taken possession of them as well, either by becoming similar to them, or by conjoining with something which has become similar" (IV.4.23.6–7, translation modified).¹¹

Either way, the requisite input for perception of external objects is the soul's grasping something of the external object by becoming similar to it. The problem is that the object cannot make the soul similar to it because of the categorical difference. Plotinus suggests that the soul relies on some special relation to an item that *can* become similar to the external object. Whatever this relation may be, it cannot be a replication of the relation of the soul to the object, since this is the categorical gap problem that Plotinus is trying to solve. Plotinus addresses the soul and body problem by conceiving of a mixture of the mental and the physical, namely, of soul stuff and physical stuff, which is of *uniform* constitution ("of one matter"). The sense organs are *not* half-physical and half-mental in the way in which (by analogy) a marble cake is half vanilla and half chocolate but rather in the way in which (by analogy) a mixture of hot and cold water is lukewarm, although the analogy is stretched here, because of the categorical difference between the mental and the physical. Their matter is uniform in the sense that every part of it is of the *same* type but also the type is *simple* in the sense of not being a compound of many, even if it is made out of many (and yet it is not the causal result of a process of composition).

It is such matter's oneness and lack of internal complexity that makes it possible for the soul, via the sense organs, to respond to the external object's affections and perceive them. Plotinus is assuming that the mental and the physical can be found in nature fused or blended together, in the sense organs, even if they cannot interact causally between them.¹² Through the fusion of soul stuff and physical stuff, a communication route opens between the soul and the external objects, which allows for mind–body mediated interactions. The question for us is this: can we understand such cross-categorical blending?

I am not interested here in the plausibility of the idea that such blend is possible in the case of the mental and the physical but in whether Plotinus' conception is comprehensible or not. In favor of Plotinus, I will only mention that if we can make sense of the mental having supervenience relations to the physical; or, on different theories, of the mental being physical; or of the mental not being physical; or of both being aspects of one and the same thing, why could we not make sense of other types of cohesion between the mental and the physical, such as Plotinus conceived? If there is something that makes such a mixture incomprehensible, it would be valuable as well as interesting to find out what it is.

Positing an intermediary type of entity, such as the sense organs, is a significant theoretical development on the part of Plotinus. He uses it to explain fundamental cognitive phenomena that otherwise remain puzzling. His solution rests on the metaphysics of intermediary entities, which he only briefly sketches. It is therefore reasonable to try to understand his claims in the light of Platonic and Aristotelian metaphysical positions that could possibly support Plotinus' conception of an intermediary type of entity. I have already mentioned which ideas of Plato's seem to be in the background. I now turn to Aristotle to introduce three different metaphysical positions of his and examine how they could each contribute toward our understanding of Plotinus' innovation. I will argue that Plotinus' assumption that the blend of different types of entities can be uniform can be understood in the light of Aristotle's account of mixing.

Intermediate uniformity: lessons from Aristotle?

Whence and how can such an intermediate blend be—not in terms of the causal history of its production but of its metaphysics, even if it is an ontological primitive? Plotinus does not make any explicit reference to Aristotle's theory of mixture, but in absence of any account of his own, for the oneness of the matter in a sense organ, I submit that Aristotle's theory is a helpful model to introduce to us how Plotinus conceives of his mixture of sensible and intelligible stuff.¹³

In the *De generation et corruptione*, Aristotle undertakes to explain the metaphysics of mixing elements; he innovates metaphysically by showing that there is a way in which the mixed elements can be both present in as well as absent from a mixture. Aristotle writes: “[W]hen the two [elements] are more or less equal in strength [i.e. in power of influence], then each changes from its own nature in the direction of the dominant one, though it does not become the other but something in between and common to both” (*De generation et corruptione* 328a28–31).

Importantly, when the elements mix, they “survive” mixing; the items that are mixed are not destroyed in the mixture. Aristotle makes the point thus:

Since some things that are, are potential, and some actual, it is possible for things after they have been mixed in some way *to be and not to be*. Some other thing [the mixture] which comes to be from them is actually, while each of the things which were, before they were mixed, still is, but potentially, and has not been destroyed.

(De generation et corruptione, 327b23–25, *my emphasis*)

In other words, although the mixture becomes like a mixture of hot and cold which becomes warm, the difference here is that Aristotle additionally assumes that the original mixants survive in potentiality. In general terms, mixtures of this kind are constitutionally uniform but are also complex compounds. They are uniform as mixtures but complex compounds in that they literally consist of the mixed elements (which are of different natures and are not destroyed, but survive in the mixture *in potentiality*).¹⁴ The uniformity of mixtures is the crux of Aristotle's theory of mixing, which makes his account an apt starting point for how Plotinus conceives the matter of the sense organs—their matter is uniform, just as the matter of Aristotle's mixtures. However, in Aristotle's mixtures the two mixants, which are of different types, are somehow present in it (in potentiality, and can be retrieved). For Plotinus, the two extremes are not present in the intermediate in potentiality, as in Aristotle's mixtures. Rather, they are present not as parts but as aspects of a uniform stuff of the sense organ.¹⁵ These aspects are both of the same ontological level—there is no constitution or supervenience relation between the physical and the mental properties of the uniform stuff.

Aristotle does provide a metaphysical account of how uniformity is possible in his mixtures, which rests on the assumption that the properties of the two mixants can affect and compromise each other—e.g., the sweetness of honey and the sharpness of wine compromise each other into half sweet and half sharp. This capacity to compromise each other, crucially, is what is called into question when the properties of the mixants do not belong to the same category of being, e.g., temperature or weight, as they do not in the case of the physical and the mental properties. This difficulty is not raised or addressed by Plotinus. Yet Aristotle's theory of mixing aids our understanding of Plotinus' views and gives us a way to comprehend how he may have thought of the fusion of the mental and the physical, as if they were opposites, having degrees of difference in between.¹⁶

Other speculative interpretations of what may underpin Plotinus' thinking of the uniform matter of the sense organs are also possible. Clues in Plotinus' text point to other areas of Aristotle's metaphysics. Plotinus' explicit stance is that a single type of (uniform) stuff is sensitive and responsive to two (categorially different) types of being (the physical and the mental). Can the relation of constitution, as developed in Aristotle's metaphysics, explain how Plotinus' sense organs bear both physical and mental properties?¹⁷ If Plotinus adopted this model, the challenge for him would be to account for how a single type of uniform matter can constitute two categorially different beings (properties).

One could be inclined, and possibly Plotinus was, to look for a solution in Aristotle's account of what is "one in number and two in being" as given in the *De anima* and in the *Physics*. Aristotle writes about sounding and hearing the sound:

The actuality of the perceptible and of the perceptual experience is *one and the same*, although their being is not the same. I mean, for example, the sound in actuality and hearing in actuality; [...] when that which can hear is hearing and that which can produce sound is producing it, then hearing in actuality and sounding in actuality come to be at the same time, and might call the one hearing and the other sounding.
(*De anima*, 425b26–246a1, my translation and emphasis)¹⁸

Is this an instance of a single type of uniform substratum underlying two different types of being—sounding and hearing? It isn't, as far as Aristotle tells us. The activity between patient and agent of change is numerically one, but it is not assumed to be uniform any more than asymmetric relations are uniform (e.g., the relation of motherhood: *a* being *b*'s mother). So we conclude that Aristotle's account of one in number and two in being cannot provide the oneness that Plotinus needs, namely uniformity, so as to offer metaphysical underpinning to his view of the operation of the sense organ.

Among contemporary scholars, Sara Magrin reaches a different conclusion. It will be helpful to explicate my argument in contrast with hers. She claims that Plotinus:

appropriates one of the main conclusions of *Physics* 3.3, viz. the thesis that the activity of the agent is the same as the activity of the patient, and in the light of it he argues that the external activity of the agent is the same as the effect produced by the activity of the agent ... [which Plotinus applies] to explain colour transmission in vision.
(2010: 275)

The reasoning here is incorrect. Magrin believes that Aristotle holds that, in her words, "the activity of the agent is the same as the activity of the patient." Her statement is ambiguous and could be read as claiming either that the activity of the agent is the same in some respect as the activity of the patient, or that they are identical. The first reading would be true of what Aristotle says, but the second false, contradicting the major metaphysical breakthrough of Aristotle's in this passage, as I will show below. The statement read in the first way, however, does not support the conclusion that Magrin derives directly from it: if the activity of the agent is the same in some respect as the activity of the patient, it does not follow that "*in the light of it* he [Plotinus] argues that the external activity of the agent is the same as the *effect* produced by the activity of the agent" (Magrin 2010: 275, my emphasis). It is clear that Magrin thinks that Plotinus is justified in drawing this conclusion "in the light of" the position she thinks Aristotle reaches in *Physics*, III.3. It is as if Aristotle had said (using his own example of the *De anima* we mentioned above) that sounding is the same as hearing (since, per Magrin, "the external activity

of the agent [the sounding of a bell] is the same as the effect [hearing the sound] produced by the activity of the agent”). Did Aristotle make such a surprising claim?

Before explaining what Aristotle claimed, we should remind ourselves of his own statement in *Physics*, III.3 that, “it is nonsense that two things different in essence, e.g., the agent’s acting and the patient’s being acted upon, have one and the same actuality” (202a36–b2). Their oneness cannot be identity. However, their oneness can be *in number*, without oneness in being; rather, Aristotle tells us, they are two in being. I mentioned above Aristotle’s position concerning being one in number and two in being, which he uses in his account of perception developed in the *De anima*.¹⁹ During any causal interaction, the mover moves in actuality, and the movable is actually moved. These two actualities are not identical, but, Aristotle argues, there is a special relation of ontological dependence between them; the occurrence of either requires the occurrence of the other. Metaphysically, this is realized in a single activity, which, as Aristotle tells us, is one activity which is two in essence (*aka* in being). While explaining how the sameness of the activity of the agent (e.g., teaching) and of the activity of the patient (learning) does not produce nonsensical results, Aristotle writes:

Nor is it necessary that the teacher should learn, even if to act and to be acted on are one and the same, provided they are not the same in respect of the account which states their essence ... but in respect of that to which they belong (ὅ ὑπάρχει ταῦτα), the motion.
(202b5–21, translation slightly modified)

So it is the underlying causal activity that is a common substratum for the teaching and the learning, or the sounding and the hearing; but the constituted activities of teaching and learning, or of sounding and hearing, which the common underlying activity grounds, are different in essence (*aka* in being). This Aristotelian position might have possibly motivated Plotinus to argue that there is a single matter in the sense organ, underlying the sensible physical form received by the sense organ from the object, and also underlying the mental form the organ transmits to the soul with the information about the physical form. This would be so only if Plotinus failed to realize that Aristotle is here talking of the matter being one in number only, a model that would not entail the uniformity of matter that Plotinus needs to resolve the categorial problem.

Finally, a third model that Plotinus might have drawn on, also from Aristotle’s metaphysics, is that of a single point on a line; the point is at once two distinct limits: it is the end point for each of the two half lines it divides. Thus, the point is one, but it constitutes two limits. In the *De anima*, Aristotle puts forward this model and explores its applicability in addressing the question of how a sense can at one and the same time be causally affected by different sensibles, such as sweet and bitter, or sweet and white, simultaneously. (Aristotle will conclude the model is not applicable):

Just as what is called a “point” is, being at once one [point] and two [limits], properly said to be divisible, so here, that which discriminates [i.e. the sense organ] is *qua* undivided one, and active in a single moment of time, while *qua* divisible [perceiving two different qualities] it twice over *uses* the same dot at one and the same time. So far then as it twice over uses the limit, it discriminates two separate objects [e.g., sweet and bitter] with what in a sense is separated: while so far as it uses it as one [sense content], it does so with what is one and occupies in its activity a single moment of time.

(*De anima*, 427a10–14; my emphasis; translation slightly modified)

In this example, the point, qua simple, can be assumed to be uniform, and this fits well with Plotinus's *desideratum* that the matter of the sense organs is homogeneous stuff (even if made out of both mental and physical stuffs). However, an important disanalogy between Aristotle's and Plotinus' cases remains: the two limits which the point grounds are the same in kind, even if numerically different; while in Plotinus' theory of perception, there is a single substratum that supposedly grounds beings that are categorially different.²⁰ The disanalogy is significant if we take Aristotle's model to presuppose a constitution relation between the point and the two limits because Plotinus' account assumes that the same substratum can constitute categorially different beings.

In conclusion, I submit that Aristotle's theory of mixture, the first of the three models above, remains the best candidate to serve as the metaphysical account that underpins Plotinus' theory of the constitution of sense organs, even if we can only speculate on the basis of textual clues that this is how Plotinus was thinking. In the preceding sections, we have examined what Plotinus sets out to account for, in his theory of perception, and which difficulties he encounters; how he comes to his proposed solution; and what metaphysics might underpin it. I turn now to the question of whether Plotinus has delivered a philosophically sound solution.

Has Plotinus solved the categorial gap problem?

Plotinus' solution to the categorial gap problem between the external physical objects and the perceiver's soul is to posit a causal intermediary that can resemble the physical object and can also inform the soul. This is made possible by a substratum, which is, I have argued, a *uniform* mixture of mental and physical stuff that can interact with both, the object and the soul, thereby grounding physical properties and mental content. Has Plotinus thus solved the categorial gap problem that he set out to address in this theory of perception? He believes he has: "it is clear that sense-perception belongs to the soul in the body and working through the body" (IV.4.23.48–49).

There are, however, some outstanding philosophical issues with Plotinus' account of perception of objects that I want to raise. The first is that the substratum that Plotinus posits for the sense organ comes with the cost of an additional primitive in his ontology. Since, as he says, the soul cannot by itself interact with physical objects in the world,²¹ the intermediate mixture of mental and physical in the sense organ cannot be a product of soul-object interaction. It must be primitively existent in nature. Yet how is this intermediate mental-physical mixture constituted? Are we to understand its composition in accordance with Aristotle's principle, that opposite properties can compromise each other in mixtures, which, though, does not apply to categorially different properties—or does it? We can only expect suchlike "tensions" in accounts of the mental and the physical that attempt to somehow bridge the categorial gap.

Further, Plotinus assumes that positing an intermediary whose matter is in between mental and physical stuff somehow "reduces" the existing categorial gap between the soul and physical objects. It is as if these are conceived of as extremes on a spectrum, where the intermediary blend is midway between the extremes. As mentioned above, this presupposes that the intermediary differs from the categorially different extremes only by degrees. The question that remains open is how can two categorially different beings be extremes on a spectrum—a spectrum of what; degrees of what? Are all these theoretical costs that Plotinus' theory incurs, or promises of a novel understanding of the mind-body problem, one of the hardest problems in philosophy?

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Notes

- 1 In fact, this is what Plotinus does, by introducing a further cognitive state of awareness, other than apprehending what is in itself [[Q: itself?]], to explain how the soul is aware of the One: “awareness of this Principle comes neither by knowing nor by the Intellection that discovers the Intellectual Beings, but by a presence overpassing all knowledge” (6.9.4). Thus, the soul is aware of the One but does not apprehend the One or know it, which would divide the soul into subject and object of its apprehension.
- 2 Even if self-awareness is introduced here, it is left unaccounted for. The mechanism of becoming aware of external objects, which Plotinus is about to outline for us, cannot apply to the soul by itself thinking itself as pure thought; for, if mechanism of self-awareness involved becoming similar to the object of awareness, this would result in a regress.
- 3 This point is debated in the relevant scholarly literature, but such debate is not relevant for present purposes.
- 4 The Form of Fire is, of course, three-dimensional, but it is not in space; namely, it’s not in the space where physical fires are.
- 5 In the original: διελημμένην [τὴν ψυχὴν] γε οἶμαι ὑπὸ τοῦ σωματοειδοῦς, ὃ αὐτῇ ἡ ὁμιλία τε καὶ συνουσία τοῦ σώματος [...] ἐνεποίησε σύμφυτον.
- 6 I talk of similarity on the basis of Plotinus’ use of the term “ὁμοιωθεῖναι” (IV.4.23.30), although his explanation in that passage, IV.4.23.29–32, may suggest talk of fit: “suitable to be assimilated [ὁμοιωθεῖναι] to each, to the external object by being affected, and to the internal knower by the fact that its affection becomes form” (IV.4.23.29–32).
- 7 Intermediate, in the sense of a property “which lies *between* the sensible and the intelligible” (IV.4.23, my emphasis) rather than having some properties from both kinds.
- 8 The key sentence in the original is: Συμπαθὲς ἄρα καὶ ὁμοιοπαθὲς δεῖ εἶναι καὶ ὕλης μᾶς.
- 9 By this I mean what Plotinus describes, e.g., in IV.7.8b.2–7.
- 10 Plotinus clarifies that *assimilation* to the extremes is not *identity with* the extremes. He writes that the organ “must not be the same either as the knower or what is going to be known” (IV.23.4.28–29). Assimilation should be understood as similarity or congruity.
- 11 In the original: εἰ δὲ καὶ ἄλλων, δεῖ πρότερον καὶ ταῦτα ἐσχηκέναι ἥτοι ὁμοιωθεῖσαν ἢ τῷ ὁμοιωθέντι συνοῦσαν.
- 12 A clarification is in place here: in contemporary philosophy, dual-aspect monism posits the mental and the physical as aspects of a single type of entity; but Plotinus was not a monist. He is a dualist, who thought that the mental and the physical can also mingle into a uniform stuff. See also footnote 000 below. [[Q: please update the cross-reference now]]
- 13 The thought here is not that Plotinus makes use of entire metaphysics of mixture developed by Aristotle but rather that Aristotle’s theory gives us a model for interpreting Plotinus. On Aristotle on mixture, including an analysis of alternative interpretations to the one I endorse here, see Scaltsas (2009).
- 14 Aristotle explores in the *De sensu* whether his theory of mixtures as introduced in the *De generatione et corruptione* might offer a solution to the problem of the complex perceptual content, that is, how multimodal inputs is unified in a single content of perception; but he concludes in the negative. For further discussion of this topic, see Marmodoro (2014: 216–220 and 268–270).
- 15 In this respect, the account resembles dual-aspect monism, although if Plotinus is following Aristotle’s account of mixture, the nature of the mental and the physical in the matter of the sense organs is “compromised,” so that there cannot be a “purely” mental and a “purely” physical aspect in it. Additionally as we saw in footnote 000 above, Plotinus is not a monist but a dualist. [[Q: please update the cross-reference now]]
- 16 Brian Greeny suggested a further possibility; that of an intermediate analogous to the case of hot oil and cold water, which when combined do not mix, but still do produce a warm liquid.

- 17 On the previous model of mixture, there was no relation of constitution in play.
- 18 Aristotle puts forward this view in the *De anima*, III.2 and in *Physics*, III.3; for in-depth discussion of the relevant texts and alternative interpretations, see Marmodoro (2007, 2014, chapters 1 and 2).
- 19 The relevant passage in the *De anima* is in fact a direct application of the metaphysical account Aristotle introduces in order to explain causal interaction in *Physics* III.3. Aristotle develops there a complex argument framed as a dilemma which I called elsewhere *The Actualities of Motion Dilemma* (2014: 47). His goal there is to investigate the metaphysical relations holding between the actuality of the activity of the mover and the actuality of the activity of the moved in any causal interaction.
- 20 Aristotle explains this in the context of discussing the unity of multimodal content (e.g., when perceiving a white and sweet cube of sugar). The question is how a sense can at one and the same time be affected by different sensibles; (one of) the model(s) Aristotle puts forward to address it (even if he ultimately rejects it as an adequate account of the unity of complex perceptual content); on this topic, see Marmodoro (2014: 238–246).
- 21 See IV.4.23.1–8 and 14–15, and in particular the claim that, “there is something more here than the external thing and the soul; for the soul is immune from experience [with the external object]” (6–7).

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PART III

Problems of perception in medieval philosophy

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INTRODUCTION TO PART III

Brian Glenney and José Filipe Silva

if the bodily organs are disturbed, the operation of the sense-power is impeded;
and if they are removed, the sense-power is completely removed as well.

(Thomas Aquinas, Commentary on De sensu et sensato, Prologue)

For much of the medieval period, philosophy of perception concerned not whether we can directly perceive the external world but *how* we perceive the external world. In other words, the key question is not epistemic but mechanistic, i.e. about the processes by means of which one comes to know sensible features of objects in the external world. The “can”—that we *can* know the external world—is simply taken for granted during the most part of the period, with some very late exceptions, some of which are discussed in articles in this volume. But even accepting that we can have that knowledge, there are enough hurdles to clear in explaining *how* this is possible, especially in face of two central claims medieval thinkers inherited from their ancient predecessors, especially Aristotle, the first being that in standard conditions we perceive (sensible features of) things as they are in the world.

This first claim about perception is quite strong, so it is worth repeating in full: if the conditions are normal, i.e. there is a properly operating subject (well-working cognitive powers and well-disposed sense organs), an undisturbed medium, and the object is unhindered in its action, the perceiving subject cannot fail to directly and accurately perceive the object. In other words, we can perceive those sensible properties if they are there to be perceived because the perceptual act could not have arisen from what is not. Perception is thus dependent on the existence of powers as natural capacities in both the object and the subject so that their workings are explainable in the context of a general theory of change: the sense-power is in a state of potentiality to the sensible thing, and when that thing is present the activity of the sense-power is realized; at the same time, the perceptibility of the object is also realized in its being perceived. A modern way of understanding this process is to think of the sensory apparatus of a perceiver as a “feature-detection mechanism” that is triggered by specific input. The focus of the theory is then to explain the specific sensitivity of the cognitive faculty that is set off by a given feature in the world. (We shall return to this later on.) This entails two major claims: (1) a metaphysical realist claim concerning the nature of things in the world, as objectively having the kind of sensible features in their composition that are perceivable by a properly endowed subject; and (2), an epistemological realist claim

concerning the capacity of certain kinds of beings to be able to perceive these real features in an objective and accurate way, provided the conditions are optimal.

The second claim concerns the ontology of the soul, which is constituted by a number of domain specific powers or faculties (to which we have just alluded) that are explanatory of the way a certain input gives rise to a certain reaction. The model of faculty psychology is found in an inchoate manner in Aristotle but further developed by some of his interpreters, especially the great philosopher Ibn-Sina (Avicenna, as he is known in the Latin West). According to this model, there is, in addition to the external senses, a number of internal senses, which are processing faculties responsible for storing (e.g., memory) and creating (imagination) new content from the sensory information received and making this content available to further processing by the intellect, which has contact with the world of physical objects only indirectly, i.e. via the senses. In the case of the so-called external senses, i.e. the five sense modalities of sight, touch, taste, smell, and hearing, this requires also the existence of appropriated organs, which the faculties of the soul in-form. A sense is then a matter-form composite entity. The matter is thus disposed in such a way as to allow the form to perform its function, such as to see. To be appropriated in this case means to be able to receive the sensible form (the species) issued by the object, which means that it must be neutral with respect to a given range of sensible features: e.g., the eye must be transparent because being of a given color would restrict the range of colors it is receptive of and its accuracy conditions with respect to these. It is important to note that seeing is a psychological operation performed in and by means of a sense organ, but that it is not the sense organ that sees; rather, it is the power of sight (a power of the soul) that does the seeing. The internal senses, on the other hand, are also given a bodily location, for instance (and primarily) the brain, but the material conditions affect the way they perform their operations and not the nature of the operations nor their object. It is with respect to some of these aspects or features of material things, and the corresponding psychological faculties that have these as objects, that medieval philosophy improved with respect to the ancient thought. More particularly, Avicenna's model of faculty psychology and Averroes' notion of intentionality lays the foundation for today's best accounts of the nature of sensory representations. But these improvements, often influenced by Neoplatonic thinking, are built on top of the Aristotelian model of mind and cognition.

The general picture is of a subject tuned in to certain sensible features of the world by means of having fine-tuned sensory capacities and a world that has certain sensible features that can be perceived by an appropriated capable subject. The issue is then how those sensible features are made available to such perceivers. To say that objects need just to be within a perceiver's perceptual field was probably too vague as an explanation, so something more concrete was needed. A common view that circulated widely in late antiquity was that of visual extramission, whereby our sense organs for visual perception, the eyes, would emit visual rays of disputed nature that would purportedly extend to the object in the visual field and, making contact with it, would bring back to the eyes the required sensory information. Crude as it may seem, the theory found many supporters but also detractors. Such a theory was problematic in a number of ways, namely because it seemed to be endangered by the time-consuming process of being issued and received again, extending over large expanses of space in some cases such as seeing the stars in the sky (see, e.g., Aristotle, *De anima*, 438a25 ssg; Alhacen, *De aspectibus*, I.6.55–56).

An alternative view, which was largely accepted in the medieval period, explained the process the other way around: the sense organs receive the sensory information coming from the external objects in the form of representational devices called "species." Numerous debates issued about these species, namely about (1) their ontological status, i.e. what sort of

entities they were; (2) what did the species represent, i.e. the whole object, a part of the object, a quality of the object; (3) how did the species come to represent what they did, if they were generated or issued forth by a material thing; (4) what kind of change in the medium and in the sense organs did the species cause, namely whether it was a natural change whereby the recipient took that quality (if it were a quality) complete in its natural being or another (intentional, spiritual) kind of change; (5) was the species the efficient cause of the actualization of a sensory power of the soul, so that it could be said that the object via the species was the cause of its own cognition, or was there the need for a different entity to bring about the perceptual act itself? These are some of the questions raised in the period; the variety of answers prevents us from even attempting an overview in this brief introduction, though the essay by José Filipe Silva and Juhana Toivanen in Chapter 6 provides greater detail.

Let us instead concentrate on the overall nature of the process. It is essential to understand that this doctrine of the species being received by/in the perceiving subject worked perfectly in the context of a largely passive Aristotelian account of perception, according to which “perceiving is an affection” (*passio*). The actualization of the power, e.g., for seeing, is the result of the causal action of the object affecting the sense, impressing its form without matter (the species). Despite lack of clarity about what these species represent, let us for the sake of brevity take them here as representing sensible features of things, for instance a color like “red.” The assumption is that an object has a natural capacity to issue such a representation of its property “red” and that a cognitive subject receives this representation in such a way that comes to be aware of that feature *in the object*—or, alternatively, comes to perceive the object as having that feature. The perceiver’s sensory apparatus, their sensory faculties, are tuned to and thus perceptive of these features by means of their representative species. The whole process could then be described in the following way: I see a red thing because (1) I am the kind of being that has the capacities to see red; and (2) the thing which is red is present to my visual field and is such that generates species of red to the surrounding medium. But that is just part of the story because the medium itself must be such as to be able to receive (without being qualified by it, i.e. without becoming red) and to transmit the species from the object to the sense organs of the perceiver. Aristotle elaborates on the exact conditions that have to be present in the media required for each of the sense modalities, which in the case of sight must be air or water, on account of their (potential) transparency (actualized by being illuminated by a luminous body). Furthermore, to each sense object corresponds a certain specification of the conditions in the medium (and in the bodily sense organs in which and by which the operations of the external senses are realized).

We have mentioned before that in normal operating conditions the perceiving subject cannot fail to apprehend the object, but as some of the articles in this volume show, this general optimistic thesis required a number of important qualifications. The first of these is that the “normal” conditions should best be interpreted as optimal, meaning that they are less common than would seem at first sight (no pun intended) because they are very demanding. This shows that when Aristotle proposed this set of requirements he was mostly operating at a very high level of abstraction such that the theory often struggles to find an application in the real world. On the other hand, that is precisely the advantage of the theory, which keeps its explanatory worth despite changes in the contingent conditions.

Returning to the main theoretical framework, it should be noted that failures in any of the normal operating conditions have consequences for the accuracy of the perceptual experience. This aspect sits at the core of the medieval debates over the problems of perception because less than optimal conditions of the medium, what Silva and Toivanen’s essay calls “transmission problems,” lead to distortions in the perceptual experience. But disturbances in

the medium are not the only way transmissions go wrong: we often misperceive because our sense organs have, at the outset of a given experience, a disturbance in their material dispositions or because the internal sensory processing powers fail to perform their operations properly (lack of attention, overloading, etc.). Among these is the common sense, which is defined by many authors as the power that combines sense data from the different sense modalities. One way this can be still made more specific is by considering the different kinds of objects of perception, that is the way the perceptual system can fail in what concerns the apprehension of proper, common, and incidental sensibles—the different aspects a perceptual object can be considered.

Corresponding to the number of perceptual objects—proper, common and incidental sensibles—are different kinds of perceptual problems. Here we find a clear distinction between the failures of apprehending the proper sensibles, i.e. the proper sense objects of a sense modality, like color for sight, flavor (sweetness, etc.) for taste, etc., which is the result of either the less than optimal conditions of the medium or the state of the sense organs. These organs can be offset in their standard, required dispositions: the taste of an ill person is certainly disturbed in its capacity to apprehend the *ratio* of flavors present in a certain food. But the powers of the external senses cannot fail in their operation, if the conditions in the medium and in the organ are normal because they operate by an, as it were, on–off switch mechanism, so that I either, e.g., see a color because the color is present to me, actualizing my capacity for seeing it or I do not because there is no such color in my visual field. However, a main source of problems is when the internal processing faculty of the common sense adjudicates a sensible fact on the basis of improperly (or incorrectly) combining different sensible features, like sweetness and yellow, a problem Silva and Toivanen's essay calls “errors of judgment,” since they result from failures of the complex cognitive apparatus, which occasionally does not operate properly when combining and interpreting the raw data that is received via the senses” (p. 107).

Even more distant from the perception of the proper sensibles is incidental perception, whereby one gets acquainted with those sensible aspects of things like the object qua “that which is the subject” of those sensible properties apprehended by the proper senses or “that in which” those accidental features inhere. Substance or human being or the son of Diares, to use an example from Aristotle himself, are such incidental sensibles. The probabilities of misperceptions increase exponentially in this kind of perception because incidental sensibles do not affect per se (i.e. in and of itself) any external sense faculty, at least in the strict Aristotelian model. Incidental perception is given little attention in Aristotle, but it became a central issue in late medieval developments of this model. Among this type of object is the notion of intention, intended to provide an account of the reactive behavior animals display toward one another in a way that we would now refer to as “instinct.” According to Avicenna, who introduced this model of explanation, intentions explain why the sheep runs away from the wolf at their first encounter.

Animal instinct, for example, provides a test case in Wodeham's discussion of sensory illusions. As H. T. Adriaenssen argues in his essay, illusions for Wodeham are due to errors in linguistic norms like sentences. “The sentence we entertain in and of itself has an aptitude to trigger the judgment that things are in a certain way” (p. 155). If I say, “the stick is bent” when observing it half out of water, then the stick will appear thus due to my inclination to assent to my claim. As “evidence,” Wodeham claims rather notoriously that dogs, lacking language, could not experience the bent-stick illusion. If they could it would be due to some nascent cognitive ability but nowhere near as sophisticated as human intelligence. Thus, just as human and animal cognition is distinct, so too must the instinct of human and animal.

Human instinctive behavior cannot be accounted for on the basis of experience (i.e. based on previous encounters) because it takes place in the first of such encounters or even inferential processes (beings with big teeth are dangerous; this being has big teeth, thus this being is dangerous) because such processes are usually attributed to rational beings only. By introducing intentions as part of the content of animal perception, Avicenna carved a significant shift into the way perceptual acquaintance was to be explained and gave rise, in some parts of the Aristotelian tradition, to new reflections on what other aspects of things in the world that Aristotelian model left unaccounted for. The question is what (if any) sensory faculty has that aspect of the perceptual object as its proper object of cognition. Avicenna, as we have just seen, takes the apprehension of intentions, such as “dangerous,” to be the task of estimation; Thomas Aquinas takes the apprehension of something as an instance of a kind—*this* human being—to be the operation of the cogitative power; Francisco Suárez takes both forms and intentions to be apprehended by one and the same power, *phantasia*, as he reduces all internal senses to that single power. In any case, intentions in particular, but also incidental perception in general, fit well within the broader picture of perception that is motivated by teleological (i.e. end/goal-oriented) concerns: acquaintance with the world is essential to the survival and well-being of all animals, and that is why these are naturally equipped to deal with accuracy with objects and their properties.

That concern with the purposefulness of perception brings to the fore one important aspect of medieval (but also to the ancient) cognitive models: the focus of the explanation is on the nature of the process, physical in what concerns interaction between material entities, such as the object and the sense organs, and psychological in what concerns the internal mechanisms of information-processing. There is a clear absence of interest in the more phenomenological aspects of perception, which are central in contemporary theorizing on perception. The “what is like” of the perceptual experience is either completely irrelevant to the explanation of the process or fully exhausted by the metaphysical explanation. (There are very few examples of “phenomenology” having a special role to play on the description of a perceptual experiences, although one can find such examples, for instance in Peter John Olivi and Walter Chatton.) That seems to be the case even though one of the operations of the common sense as an internal sensory faculty is to be the “perception of perception,” a second-order act by means of which one is aware of undergoing a perceptual experience. But nothing in the explanation of how we know external things hinges on this act of awareness, which in fact seems to follow, i.e. to take place *after*, it. So, for instance in the important case of the discrimination between episodes of perception while asleep, i.e. dreaming and episodes of perception while in a state of wakefulness is not, for most authors, possible from a phenomenological point of view: they just feel like the same. Rather, as Silva and Toivanen describe, it is the loss of rational ability that makes dreaming identifiable. “When one is asleep, the connection between rational judgment and the internal senses is blocked or disturbed due to the movement of animal spirits, and reason cannot intervene in the process” (p. 116). Even though this may seem odd to the contemporary reader, the justification of knowing the external world lays in the metaphysical-based kind of explanation for perception that medieval thinkers inherited from their ancient counterparts.

The most important challenge to the general model is found from the fourteenth century onwards, by means of questions about the direct nature of perception, namely can we perceive something as present and existing? If I have no way to self-warranting that my perception of *x* is a perception of an actual existing *x*, the possibility of any perception being deceptive must be taken seriously. The debate over the nature of intuitive cognition

(from Duns Scotus) and the reality of apparent being (from Peter Auriol) coupled with the question of singular knowledge (can the intellect know an individual directly?) fragmented an already diverse theoretical field and threatened the dominance of the Aristotelian-based model of cognition. But this threat did not question the general optimistic belief on the trustworthiness of perception; that is to say, skepticism remained a marginal view. (Recent studies show how skepticism is in most cases the unwanted consequence of a given theory rather than an explicitly stated aim.)

One peculiar case to illustrate how the direct nature of perception was thus questioned is the case of mirror perception, as discussed in Lukáš Lička's essay. Mirror perception is peculiar, as Lička describes:

[I]t is mind-dependent at least to some extent, or rather observer-dependent: its location changes depending on the observer's position; the whole scenery seen in the mirror is reconstituted every time the observer moves. Further, the mirror image is perceptible to one sense alone: unlike everyday objects, mirror images can be seen but cannot be touched.

(p. 132)

But accounts of perception are not phenomenological, nor really concern physical processes. Rather, they are explained in terms of ontological categories of species and genus. Auriol, for instance argues that:

When a *species* of the object reflected from the mirror enters the eye, it is processed by the observer's visual power. However, as sight is unable to account for the mirror's intervention in the propagation of *species*, it works as usual and generates the *esse apparens* (according to the information in the *species*) somewhere in the direction from which the *species* came. Hence, the object seen in the mirror seems to be on the prolongation of an imaginary straight-line drawn from the eye outwards.

(Lička, p. 142)

To explain the nature of direct perception is thus to account for how the mind makes contact with external reality, even when the transmission of that contact is exotic—even when reality is accessed through a reflective plane that itself goes unnoticed.

Chapters in this volume address such complex issues that stand at the core of very late medieval epistemology, but the focus has been on the more traditional aspects of what happens in those cases when the less than optimal conditions (including the normal functioning of the cognitive powers) are not met. This is not to say these issues are distinct. In H. T. Adriaenssen's essay, he claims that some problems in perception, such as the moving-trees illusion, provide an understanding of epistemological issues, stating:

Auriol introduces his notion of apparent being by considering the following illusion. Imagine you are traveling by boat and that you stand on the deck and look at the green trees on the shore. As the boat is carried further down the river, the trees that are now present in your visual field will slowly pass out of sight again, and this gradual passing in and out of sight of trees may create the impression that the trees on the shore are moving. A close analysis of this illusion, Auriol believes, will teach us some important facts about the basic mechanisms of perception.

(p. 150)

Though not comprehensive of the medieval period, this volume aims at bringing into full view an aspect of philosophy of perception that is often overlooked in traditional overviews: the story of errors and psychological misdemeanors, rather than success and achievement.

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6

PERCEPTUAL ERRORS IN LATE MEDIEVAL PHILOSOPHY

José Filipe Silva and Juhana Toivanen¹

In recent decades, scholars working in the field of philosophy have seen an increase in focus on theories of cognition, with perception receiving a fair share of this spotlight. This is to a large extent also true with respect to scholarship on medieval philosophy. For the most part, however, the focus has been on veridical perception, that is, perception that occurs under normal conditions and provides cognition of things *as they are* in the extramental world.² Our focus in this paper is on those perceptual situations when things go wrong—on episodes of nonveridical perception in which things are perceived differently than they really are.

According to a very general picture, there are three requirements for veridical perception to take place:

- 1 the existence of a perceiving subject endowed with appropriate capacities or powers, including (a) the external senses, that is to say, the sense modalities of sight, touch, hearing, taste, and smell, which are associated with the respective sense organs, and (b) powers that are responsible for processing the information further, which medieval authors called the internal senses;
- 2 the existence of an object about which (and from which) information is made available to a perceiver;³ and
- 3 the sense organs and the medium, which mediates the object and the perceiver (air or water in the case of distal senses of vision, hearing, and smell), that are in proper or standard conditions.

If these requirements are met, then the reception of sensory information leads to a perceptual experience, which makes the rational or nonrational perceiver aware of a particular external object or the perceptual property of such an object. It is important to note that these requirements are sufficiently general so as to remain largely uncommitted to any particular theory, but they are certainly characterized by having a realist and causal undertone.

Realism here means that, according to this general framework, perception pertains to perceptual properties as they exist in extramental objects, and their existence is independent of the perceiving subject. Were this not the case, all perceptions would be misperceptions, as Socrates remarks to the puzzled Theaetetus (*Theaetetus*, 157e–158a), taking aim at the Protagorean theory of perception according to which all there is change. The causal undertone

of the framework, on the other hand, means that perception requires a change caused from the outside by something (a thing or individual substance), which is already in actuality (e.g., colored) what the affected power is in potentiality to become and cognize (e.g., seeing color) (*De anima* II.12, 424a17–21). This befits the original definition of perception found in Aristotle's *De anima*: "Sensation depends, as we have said, on a *process of movement or affection from without*, for it is held to be *some sort of change of quality*" (II.5, 416b32–417a1; emphasis added). A subject endowed with specific cognitive abilities becomes aware of certain objective features or properties of things *as the result of the causal action of those properties* with respect to such cognitive abilities.⁴

Given that this framework builds on causal explanations and adheres to realist presuppositions, perceptual errors are an anomaly that require special explanation. According to Aristotle, "Perception of the special objects of sense is never in error [...] for while the perception that there is white before us cannot be false, the perception that what is white is this or that may be false" (*De anima*, III.3, 428b18–22).⁵

Aristotle intends to present a simple contrast between (1) the perception of so-called proper sensibles of individual senses (color, sound, etc.), which cannot go wrong, and (2) more complex forms of perception that involve either common sensibles (size, number, etc.) or incidental sensibles, which are often mistaken. To say that the perception of proper sensibles can never err is, however, a gross simplification of Aristotle's view, as he himself recognizes by adding that there can be error, but only "to the least possible degree" (*De anima*, III.3, 428b18–19).⁶ He seemingly provided this qualification to say that sense modalities get things right when the conditions in the medium (in the case of vision, air, or water) are optimal. Whenever these conditions are not realized, there either is no perception at all or else the object is perceived to be other than it is in reality, that is, as having a property that it does not have.

The details of the process in which the information from the object reaches the perceiver vary according to different theories. However, before the fourteenth century most medieval philosophers accepted, mostly without further ado, the basic realistic assumption that the senses are reliable.⁷ Skepticism was not considered a serious threat because perceptual errors were considered an anomaly in the general realistic framework. However, despite their optimism, medieval authors were ready to admit that perceptual errors do take place. The concern with perceptual errors was not so much with the consequences of occasionally failing to perceive things correctly; rather, the worry was about their elusiveness: can we know their source and their occurrence so that we will know under what conditions these errors occur? Otherwise, if we are uncertain of the conditions for their occurrence, it is impossible to guarantee in a normative fashion that a given episode is an episode of veridical versus nonveridical perception. The threat then is that all perceptual experiences could be instances of nonveridical perceptions. By the end of the fourteenth century, as we will briefly show, that worry had taken root in the epistemological discourse, leading certain authors to develop strategies to ward off such worries.

We proceed in this article by considering two general explanations for perceptual errors. The first consists, as noted before, of those cases where the conditions of the media through which the information is made available to the perceiver are not optimal. We also include problems related to the organs of the external senses in this category, which we call "transmission errors"; they cover everything that may affect the process of transmitting information from objects to perceivers. The second explanation for perceptual errors appeals to the further processing of this information. We call these "errors of judgment," since they result from failures of the complex cognitive apparatus, which occasionally does not operate properly when combining and interpreting the raw data that is received via the senses.

It might be argued that this distinction is problematic because a certain kind of judgment is already made at the level of the external senses—for instance, when vision discriminates (*krinein*) between black and white. This is even more pressing because medieval authors did not usually make a *terminological* distinction between this judgment and the more complex cases in which a judgment is made in relation to objects of more than one specific group of perceptual qualities—both are called judging/discriminating or making a judgment (*iudicare*, *iudicium*). This raises the question of whether these two kinds of judgments were considered to be fundamentally similar to each other, in which case the external senses, as cognitive powers, could in principle be included on the judgment side of our division.⁸ However, the judgment/discrimination that takes place in the external senses does not have a compositional structure and cannot, therefore, be true or false strictly speaking.⁹ External senses may err, but not in the same way as the higher cognitive capacities do, due to their ability to make judgments in the more refined sense.

We discuss the issues concerning transmission errors in the section “Roger That” and errors of judgement in the section “My Bad.” Both sections proceed by investigating authors representative of the “philosophical model” of Aristotelianism and its critics, as well as representatives of the “geometrical model” of perspectivist optics. The importance of this model becomes clear if one recalls that the early modern demise of the metaphysical theory underlying the Aristotelian theory of perception meant the collapse of the species doctrine (see below), but the perspectivist account survived and developed in Renaissance and early modern theories of vision and in less specialized cultural communities.¹⁰

Roger That

Transmission Errors

Perception can take place only if information from the object reaches the external senses. The connection between the power and the object calls for an explanation, especially in the case of distal senses, like sight, hearing, and smell, which are not in direct contact with their objects. The traditional way to account for how the information is transmitted and received is described by William of Ockham (1285–1347) as follows:

[N]othing acts on a distant [thing] without acting first on the medium; but the distant perceptual [thing] acts on the sense; therefore, it first acts on the medium. That which is caused in the medium is the species, therefore etc. The minor pre-mise is clear on the basis of Aristotle and Augustine, who say that the perceptual thing acts on the sense.

(Reportatio: q. 2, 44)¹¹

As is well known, William of Ockham accepts action via distance in the case of perception, and therefore he is critical of this view.¹² However, his description is accurate: most medieval authors thought that sensory information issues from the object in the form of a species (Latin: *species*). This technical term was used in an epistemological sense to account for the transmission of information from the object to the perceiver.¹³ It was understood (1) to be a representation or likeness of the object, a part of the object (e.g., its surface), or a property of the object (e.g., its color); (2) to issue forth from the object in order to make it known; and (3) to cause a change in the medium and in the perceiver’s senses. These aspects are true for all cases in which authors subscribe to this doctrine, irrespective of what each of them takes

the species to represent, the ontological status of the species in the medium, the kind of change taking place in the medium and the sense organ, and whether or not the species is taken as the primary object of perception.¹⁴

Sensible species are efficient causes that actualize the potency of a sense power. Most medieval authors thought that the change the species causes is not material. An eye does not actually turn red when it is informed by a species of redness.¹⁵ Rather, medieval authors (or at least many of them) appealed to a distinction between material and spiritual change, or material and intentional being. The species of color, for instance, has an intentional mode of being in the medium and in the sense organ; it does not make them colored but instead transmits information in an “intentional” way. Thomas Aquinas argued on the basis of this distinction that the five external senses form a scale. The sense of touch is the most material of the senses, because it undergoes both material and spiritual change—when one touches a hot stove, one perceives hotness but, at the same time, one’s finger becomes actually hot. At the other end of the scale is the sense of sight, which only undergoes spiritual change. All other senses fall in between these two.

Transmission errors in the Aristotelian/Avicennian tradition

Perception can yield reliable information about our environment only when it takes place under normal conditions: the medium must not be blocked or affected by anything, the lighting must be good, the sense organs must be healthy, and so forth. Since the process of perception involves a causal relation between the object and the perceiver, we are including under the heading of “transmission errors” all problems that affect the way the information is issued from the object and is received by the perceiver—up to and including the point in the process where the information enters the cognitive apparatus. In other words, the external senses, their organs, and their functions are included in the transmission problems. For instance, when a colored thing sends out a visible species, when the lighting conditions are right, when the medium is clear, a cataract may still prevent the information from reaching the perceiving subject correctly.

Given the fact that the objects of perception send forth a sensible species by nature (that is, automatically), the starting point of the process of transmission usually does not involve any problems. In contrast, the medium often causes different kinds of errors. Some perceptual qualities do not have a completely spiritual or intentional mode of being and are transmitted from the object to the sense organs via a material carrier—smells and sounds especially are liable to be affected by the medium, and then they reach the perceiver in an incomplete way. For instance, a strong wind confuses odors completely and distorts sounds in such a way that they cannot be perceived perfectly.¹⁶ Wind and other material causes cannot affect a visible species due to their spiritual/intentional mode of being in the medium, but even they can become confused if the light is dim, or if the air is not clear. Thus, for example, when sun shines through fog, it appears red and less bright than it really is, and things seen through a stained-glass window appear to be tainted by the colors of the glass.¹⁷

Further, an error may arise due to the state of the sense organs. Aristotle mentions that a sick person may find that honey tastes bitter, and Aquinas explains this by appealing to a change in the organ: “[A]nd similarly everything appears bitter to those who are in pain—that is, to those who have fever—because they perceive [tastes] with a tongue that is full of this kind of moisture, namely bitter bile” (*Sent. DA*, II.21, 157).¹⁸ Although honey remains sweet, a feverish person makes a cognitive error and perceives a bitter taste because of a change in the tongue.¹⁹

The state of the perceiving subject also affects more sophisticated contents of perception. Singular sounds and especially harmonies of several sounds may appear pleasing or harsh, depending on the overall state of the perceiver. John Blund (ca. 1185–1248) explains:

Inasmuch as one and the same sound appears to be harmonious to one hearer and harsh to another, it is not because of the nature of the sound itself, but rather because of the diversity of dispositions in the hearers. [...] If, however, the hearer is in good health, of the right constitution, and having the right proportion and balance of humours, the sound will seem to him to be harmonious, and it will be pleasing to him because of the correspondence of the sound to a balance with the disposition of the hearer. And that very same sound existing in the same quality will be disharmonious to the unhealthy man.

(*Treatise on the Soul*, 12, 88–89)²⁰

Harmony of sounds is not a matter of subjective taste, since the mathematical ratio between two sounds is an objective feature.²¹ Nevertheless, the state of the perceiver influences how the harmony is perceived: a healthy person perceives it as fitting into their own harmonious state, while an unhealthy person apprehends the sounds as being disharmonious. The same combination of sounds that causes pleasure in a healthy person can be perceived as painful by one whose bodily disposition is affected by illness. A similar view was defended in the case of the other senses too. Peter Olivi (c. 1248–1298) argues that whenever someone suffers or feels pleasure while perceiving an external thing, the content of the cognitive operation remains the same. The difference between individual perceivers, or different species, is due to noncognitive powers that are united with the external senses. Thus, although a bovine animal enjoys the taste of husk and humans find it rather bland, the members of these two species perceive exactly the same flavor, but only the former have an additional act of enjoyment in relation to it. Since this phenomenon also explains why a sick person does not like the sweet taste of honey, Olivi in fact rejects the idea that sickness causes misperception.²²

Olivi's theory is an exception, however. Most medieval authors accepted the idea that the suffering caused by sickness is due to a cognitive error. More generally, they thought that the state of the organ is crucial in determining how things appear to us. Albert the Great (ca. 1200–1280) suggests a simple philosophical experiment to show that this occurs in a vision. Pressing the eyeball has the effect of causing the objects in our field of vision to appear as two:

For, if a finger is pressed below the eye so that the position of the eye is changed, one thing is seen as two [...]. If we then suppose that it [scil. the reason] is held back so that it does not contradict that which appears, then it proclaims that one is two in reality, and it is deceived. If it is not held back but judges that to be nothing but an image in the sense, and not an existing thing, then it is not deceived, because that which appears in sensation does not seem to be true to it according to reason.

(*De somno et vigilia*, II.2.3, 173b; see *Aristotle*, *De insomniis*, III, 461b30–62a3)²³

The experiment shows how the state of the organ affects the way the visible species are received by it. Putting the organ in an abnormal state causes a misperception, and the perceptual content does not represent the external thing in a veridical manner, a case of overlap between transmission errors and errors of judgment. Even though the perceptual content is determined by external factors and the state of the perceiver, awareness of these conditions

makes room for correcting the mistake. If the perceiver notices that their finger is pressing on their eyeball, they do not form an erroneous perceptual belief concerning the object. Judgment is based on the perceptual content without always being identical to it, and in cases like the one mentioned by Albert, the perceptual content remains unaffected by (“encapsulated from”) the judgment. Even when the subject becomes aware that they are seeing one thing as two, the duplicate does not disappear.

The aforementioned transmission errors are based on the realist principle (to which we made reference early on) that unless there is something wrong in the medium or in the senses themselves, external things are perceived as they really are and believed to be so. This principle was also challenged in medieval discussion, as we shall see below, but we may note already here one startling idea that apparently calls it into question. When John Buridan (1295–1358) discusses the possibility of perceiving several things simultaneously (in relation to Aristotle’s *De sensu*, 7), he argues that this is indeed possible but not everything is perceived equally well. He raises a possible objection to this view: when a white object is seen simultaneously with a black object that is beside it, the white color of the first object is seen more clearly in comparison to when it is seen alone. Buridan gives an answer, which may not be conclusive but which is nevertheless possible: “if one thing appears whiter and the other blacker, it does not follow that one of them is perceived more perfectly, because perhaps this [thing] appears whiter than it is, and that [thing] blacker than it is; and in this case one would be deceived and not perceiving perfectly” (*Quaestiones super De sensu et sensato*, q. 21, 39vb).²⁴

This idea seems to go against the realist assumption that things are perceived as they are unless there is something wrong in the conditions or in the perceptual process. In this scenario, there is nothing wrong with the medium or the sense of sight, and yet the white object is perceived differently than it is in reality. It is significant that Buridan is talking about the perception of a proper sensible because in the case of common sensibles (such as size) this kind of error easily takes place. For instance, if one sees a distant object without realizing that it is far away, the object seems smaller than it is. However, in the case of proper sensibles this should not be possible. Buridan’s suggestion entails that the relation between an object of perception and its surroundings affects the way it is perceived, but it is not easy to locate the source of error anywhere in this scenario.²⁵

Perspectivist tradition

No clear distinction can be made between medieval Aristotelians and the so-called perspectivist authors in the sense that both groups take the intromission of sensory information as the background model for their theories of perception. If anything, the difference between their starting points is a matter of focus: whereas Aristotelians were more interested in the psychological aspects of the process, perspectivists emphasized the nature of the transmission of the sensory information and the interconnection between low- and high-level cognitive powers.²⁶ The focus of perspectivists is on visual perception, which they explain on the basis of visual rays flowing geometrically from every point of an object in all directions. Although there are differences between them, they shared key theoretical assumptions and even explanatory strategies. Our focus in this article will be on Ibn-Haytham, known in the Latin West as Alhacen (or Alhazen, 965–1040).²⁷

In the third book of his *De aspectibus*, Alhacen presents a systematic and comprehensive investigation of all the conditions that lead to perceptual failure. He also takes pride in proving his interpretation of visual perception and perceptual errors by means of reason (*ratione*) and experimental evidence (*experientia*).²⁸ One important element in the perspectivist

account is that occasional errors in the perceptual process do not affect the general reliability of perception; they require only that the theory provides a series of safeguards to validate the result of the experience. So, in order to understand how this model explains errors, we first need to give a brief account of how it gets things right. Second, we will need to establish a distinction between the information that is immediately made available to the perceiving subject and the content of the perceptual experience itself, which on occasion appeals to prior knowledge. In so far as the two are not fully coincidental, they constitute a source of misperception. The principle is that, with respect to the three kinds of perception postulated by Alhacen, namely simple perception, perception by means of judgment, and perception by means of reasoning,²⁹ there are three corresponding kinds of perceptual errors. Our task in the current section is to elaborate on these errors.

According to the model of perspectivist optics, visual perception requires that a number of conditions be met so that the information from the object of perception can be transmitted to the perceiver in a way that enables veridical perception. The eight conditions for visual perception are as follows: (1) distance (between object and perceiver); (2) light; (3) transparency (in the medium); (4) opacity (in the object); (5) magnitude (of the object); (6) and time; (7) as well as the fact that the object needs to directly face the eye, that is to say, it must be properly oriented toward the perceiver; and (8) the eye must be healthy (*De aspectibus*, III.3.1). As can be seen, some of these conditions concern the perceiver, while others concern the object and still others the medium between them. Fulfilling all of these conditions means success in perceiving the object as it is (*secundum quod est*), whereas failing in any one of these conditions means misperception (*De aspectibus*, III.3.6).

The first problem to be considered is the case of double vision, which takes place when the visual fields of the two eyes do not completely overlap. An introductory explanation is needed here: according to the basic model of perspectivist optics, the field of vision of each eye is defined by imagining a cone extending from the center of the eye (the vertex), the base of which is the surface of the visible object. By means of the lines radiating from different parts of the surface, the arrangement of those parts is transmitted to the eye and perceived by the perceptual power (the *ultimum sentiens*) in accordance with their disposition at the surface of the object. The more an object stands at the intersection of the two visual axes, the more clear and distinct our visual perception of it is (*De aspectibus*, III.2.61). The visual cone can be moved by moving the eyes, and this allows the perceiver to scan completely the object directly facing the perceiver. Under normal circumstances there are two visual fields, corresponding to the two eyes, which must match so that they provide the same image of the visible object facing the perceiver.

Alhacen's first solution to the problem of double vision is that the difference between the two points in the object, which are the vertex of the two visual cones, is minimal for objects of a moderate size and at a moderate distance, and, therefore, the incoming information does not vary significantly ("it will be in nearly perfect correspondence"; *De aspectibus*, III.2.7, 566). Since there is no significant difference in the overlapping of the two visual cones, the form of the object that is produced in the common nerve—where the visual rays entering the two eyes converge—also shows this same level of agreement (*De aspectibus*, III.2.15). Thus, the two rays entering the two eyes result in one form and the object is perceived as (being) one. If, however, the object is too close, the center of the object and its surrounding parts will be represented as one, because the visual axes intersect at the same point and determinate, but the extremities of the object, especially if they carry detailed depictions and are multicolored, will be perceived as double and fuzzy (*De aspectibus*, III.2.19, 261).

The next question is whether or not this explanation can be applied to the perception of more than one object at the same time. What happens when the eyes are focusing on one object, but another object, farther away, appears in the visual field? According to Alhacen, the form of that second object will be impressed upon the two eyes and will thus appear as two objects (i.e. as being located in two places at opposite ends with respect to the two eyes) and their form will be indeterminate (*dubitabilis* or *non certificata*). If, on the other hand, the additional object is quite small and close to the perceiver, then it is perceived as one (*De aspectibus*, III.2.21). Moreover, the closer it is to the center of the visual axis, the more the form is perceived as determinate. But if the object is too close to the eye, this mixes up the visual angle and the object may be perceived as being larger than it actually is (*De aspectibus*, III.7.25). In contrast, moving away from the object leads to some visible parts becoming hidden, and thus the clarity of visual perception is decreased (*De aspectibus*, III.7.22).

Misperception can also result from the relative positions of the eye and the object. Alhacen proposes illustrating this point with an experiment. He asks the reader to place a square piece of parchment with writing on it in front of the eyes and focus on the center of it: that section of the parchment is distinctly visible, whereas the rest of the writing on the parchment can certainly be seen, even though not with the same level of determinateness (*De aspectibus*, III.2.62; see also *De aspectibus*, III.5.7). Inclining the parchment thus decreases the legibility of whatever is written on it. What Alhacen is suggesting to the reader is to experiment with the limitations or restrictions of the optimal conditions for visual perception, which, for the surface of a reasonably sized object, must directly face the perceiver at a moderate distance.³⁰ When the object is not properly oriented to face the perceiver, there is no accurate perception of it, but simply misperception, in the sense of perceiving the object as other than what it is.

We saw in the previous section that the optimal conditions for perception were mostly thought to pertain to the medium and the sense organs, but they can also fail to exist in the case of the object. For instance, the lack of opacity leads to misperception. If a colored object is placed behind a piece of glass, we perceive the glass as having the color of the colored object behind it or, in the case of stained glass, being a mixture of the two colors (*De aspectibus*, III.5.10). However, in most cases the problems pertain to the conditions of the medium and the organs. The eye can be affected by an intense light so that it loses the capacity to perceive the color of an object to which it turns, and it perceives that object in a blurry manner. Or, when suffering from illness, the eyes fail to accurately perceive (thus, they misperceive) the actual colors of objects (*De aspectibus*, III.5.14). The same problem occurs when perception takes place under the conditions of too dim a light, especially if the surface of the object has subtle features, or has many different colors, in which case it will appear as being of one color only.³¹ The size of the object is also important for its perceptibility: a very small object with small features, like a miniscule animal, can be perceived but only in an indeterminate way; for instance, some of its parts are not visible (*De aspectibus*, III.3.9). Finally, the conditions of the medium that affect its transparency, like the presence of smoke or fog, foster misperceptions. In all these cases, perceptual error occurs because of absence of moderation in the conditions that make veridical visual perception possible.³²

Alhacen makes an important additional qualification concerning these conditions, namely that they are not isolated from each other. Variations in one have implications for the way the others are or can be fulfilled. For instance, the appropriateness of distance is relative to the magnitude or color of the object, the conditions of the medium (illumination and transparency), and the state of the organ (health) (*De aspectibus*, III.3.15). When all of the preconditions have been fulfilled, they then constitute the ideal conditions for visual perception, but they must be understood in relation to real things in the world, as optimal conditions for perceiving *this object* by *this perceiver* in *these circumstances*. Cases of misperception are those in which those preconditions are not fulfilled.

My bad

Errors of judgment

We have seen that problems in transmission are one of the two major sources of perceptual errors. But the transmission of information under normal conditions and its reception by properly endowed sense powers does not suffice for a description of how visual perception takes place, and, thus, it does not suffice in explaining all errors. Every perceptual experience requires the further processing of the information received, whatever its form, by a variety of other powers of the soul, the so-called internal senses. For our purposes, the most important of these are the common sense, the estimative power, and the cogitative power.³³

Perception does not concern random perceptual properties, but properties that jointly exist in a given thing (they are accidents that inhere in it), and thus, the perceptual process should account for the perception of that unified percept. A description of a perceptual experience in this conceptual framework must include the proper, common, and accidental sensibles. To the extent that some of the powers of the soul operate by means of discrimination and combination (*discernere* and *diiudicare*, functions of the common sense), which can be subsumed under the generic term “judgment,” perception includes judgment.³⁴ It is notable, however, that judgment comes in degrees; we are here using the term in a broad sense that refers to operations that are part of perception and take place without our conscious effort. This should be distinguished from a narrow concept, which is related to propositional beliefs at the intellectual level of the soul. In any case, what matters for our purposes here is that perceptual judgment is an inherent source of errors.

In the same way as there is a hierarchy of powers that operate on different levels of abstraction, there are also different levels of perceptual judgment and, correspondingly, different kinds of perceptual errors. At the level of common sense, judgment takes, according to Avicenna, the form of “this mobile [thing] is black, and this red [thing] is sour” (*Liber De anima*, IV.1, 6).³⁵ For Aristotle, the activity of combination is the most common source of error. He often contrasts this with the operation of apprehending simple terms by the intellect or proper sensibles by the external senses, which are always correct provided the necessary conditions are met.³⁶ In the previous section, we considered some cases in which those conditions were not met; the present section focuses on what happens when the processing powers get things wrong.

Internal senses mess things up

A clear formulation of the role of the internal senses in accounting for errors of judgment can be found in Albert the Great’s commentary on *De anima*:

However, in composing the sensibles, there is frequently a great deception: for instance, *what* the colored thing is (whether a golden-yellow thing is honey or yellow bile); or *where* the colored thing is; or *what* it is that makes a sound; or *where* it sounds; and so with the others. I will explain below that the reason for this is that the combining does not belong to an external sense but to some higher power, which makes the mistake.

(*De anima*, II.3.5, 103, *emphasis added*)³⁷

Each of the external senses transmits its proper sensible to the common sense and the other internal senses. Thus, when I see a duck and hear its quacking, the sense of sight apprehends a certain shape of color and the sense of hearing the sound it makes. The common sense is responsible for combining a unified representation of distinct sense modalities; its operation allows me to perceive a quacking duck. But the process is not infallible, and often the combination does not represent reality as it is. I may, for instance, fail to realize that the quacking belongs to the duck, and attribute it to some other thing in my visual field instead. Also, higher types of judgment bring uncertainty, for instance when a thing is recognized incorrectly. When I observe some yellow substance, I may mistakenly see it as yellow bile even though it is honey.³⁸

The examples that medieval authors have in mind are manifold: things on the shore seem to move when the subject is on a moving ship; stars seem to be immobile; when the eyeball is pressed with a finger, things appear as two (as seen above); an oar seems to bend in the water; a circle of fire appears when a torch is whirled around in the darkness; and so forth. On the other hand, imagination may occasionally distort our perceptions in such a way that we get the impression that imagined things appear as if they are present. This happens especially in feverish visions, in dreams, and under the influence of strong emotions.³⁹ Finally, errors often emerge in relation to common sensibles of size and shape, as is clear on the basis of the classic examples of a square tower that appears round when seen from a distance and of the sun appearing to be four cubits wide.⁴⁰

What all of these cases have in common is that the perceiving subject judges the external things in the world to be different than they really are. The psychological processes that account for binding together the different sense modalities, incidental perception, and perception of common sensibles are liable to go wrong because they are judgments made by fallible cognitive powers. The two internal senses that were usually held responsible for making these kinds of interpretations and judgments are the common sense and the estimative power (or, in certain cases, the cogitative power). In what follows, we examine in more detail some instances of the failure of these powers to execute accurate perceptions.

Let us begin with the common sense that is responsible for combining proper sensibles. Albert the Great explains that:

for although in the composition of a color with a substance, or in the separation of a color from a substance, an error takes place, there is never a mistake concerning the color. For, sight always says that red is red, but to combine redness with a certain substance that is made of copper, or with a certain substance that is made of gold, does not belong to the sense of sight. It belongs to the common sense, as will be seen below. And in this composition and division, a deception often takes place; many have believed copper to be gold, and many have thought that honey is bile because both are yellow.

(*De homine*, 261, ll. 8–18)⁴¹

Albert begins with the claim that external senses never err concerning their proper objects—a claim that, as we have seen above, must be understood as referring to situations in which the conditions are satisfied. He then goes on to consider the possibility of misjudgment, which takes place when the common sense attributes the perceived property to a different thing than that to which it belongs in reality. The act of judgment, here expressed as combining or separating (that is, affirming or denying one thing of another), is explicitly assigned to the faculty of the common sense.⁴² Its operation counts as a judgment, although it is not based

on conscious deliberation and does not count as a perceptual belief in a robust sense, which involves the use of rational powers of the soul (the Aristotelian *doxa*). The immediate and pre-conceptual judgment that a certain statue is made of gold and that a yellow substance is bile instead of honey does not have to be made consciously (although one can of course also form such a judgment more consciously as well).⁴³ Instead, Albert has in mind situations in which the association of two perceptual features of the perceived thing happens on its own (from the phenomenological point of view): we perceive a yellow substance as being bitter without necessarily forming the propositional thought, “This is bile.”⁴⁴ The common sense is responsible for combining the two qualities when one and the same thing is perceived, and it does this on the basis of the information it receives from different external senses. Propositional thought and perceptual belief concerning the nature of the yellow stuff being honey or bile arise in the intellectual powers of the soul on the basis of perceptual content, but the perceptual content itself is formed independently by the internal senses.⁴⁵

The emotional state of the subject may also radically affect the way perceptual content is interpreted and judged. External senses as such are not influenced, and the common sense does not make any mistakes in binding different perceptual qualities to one another. But, as we all know, “someone who is nervous and afraid, and a lover who is vehemently in love, are deceived to the extent that it seems to the fearful person that he sees enemies, and to the lover that she sees the loved one, just because of a very minor resemblance.”⁴⁶ The reason for this misjudgment can be found in the physiological changes that are the material aspect of emotions.⁴⁷ The so-called animal spirits (*spiritus animalis*) run about in the brain in irregular ways, and this causes errors of judgment:⁴⁸

[I]t seems to those who have fever, in whom the matter evaporates to the head, that they see animals on the wall, because randomly drawn lines on the wall resemble animals slightly. And indeed, those who are weakened in such a way that the use of reason is not hindered for them, struggle vehemently among themselves against phantasms, knowing that they are wrong [...] But if the affection of sickness is stronger, to the extent that it hinders reason, then the person is moved by the resemblance and becomes angry, frightened, or desirous, just like when the thing is present.

(De somno et vigilia, II.1.7, 167a–b)⁴⁹

The context in which Albert makes these claims is related to the question of why things in dreams appear as if they were real. When one is asleep, the connection between rational judgment and the internal senses is blocked or disturbed due to the movement of animal spirits, and reason cannot intervene in the process. Other physiological states may also have the same effect when one is awake, but when the state of the perceiver is not overly bad, there is a mechanism that counterbalances the mistake. Reflective knowledge of one’s own state allows one to make a correct rational judgment regardless of how the external world appears—just like knowledge in the case of seeing double due to pressure on the eyeball makes possible the judgment that there are not two things in reality, although it surely seems like there are.

Albert explains that the difference between the two persons in the above-quoted passage is that the less sick one is able to make a rational judgment while the one whose reason is blocked judges (*iudicat*) on the basis of the common sense or sensory estimation (*sensu communi vel aestimatione sensibili*).⁵⁰ He compares this to the Aristotelian example, according to which the sun appears to be one foot in diameter although reason tells that it is larger than

the Earth, and he also explains that a similar nonveridical judgment is made when one crosses one's fingers and touches a piece of wax with the crossed fingers. If the only source of information is the sense of touch—the eyes are closed and so forth—the resulting judgment is that there are two distinct pieces of wax. However, if the eyes are kept open, one sees that there is only one piece of wax. Although the two senses give conflicting information, the sight is a nobler and more important sense for humans, and therefore the perceiver's final judgment is not erroneous. Yet the sense of touch continues to suggest that there are two different pieces of wax. The mistake can be corrected without resorting to the higher rational capacities, but apparently it requires comparing the information from two external senses together in the common sense. It seems in the end to be a case of deferring to one sense over the other, as an instance of visual dominance.

These examples show that the error of judgment takes place in the common sense, or in the estimative power, depending on the particular case (and also on the author: some think that the honey/bile case is a mistake made by the common sense, while others locate it in the estimative power). These perceptual errors are rather common because they involve a sensory judgment that has a compositional structure, as it requires combining information from various sources. At the same time, these examples show that judgment can take place on various levels, from the external senses to the internal senses and reason.

Perspectivist tradition on errors of judgment

We have noted above how Alhacen explained that the perception of objects is affected by the conditions in the medium and the eye. Now, for Alhacen (and the perspectivists that followed), the reception of the proper sensibles of light and color are just a fraction of the visual properties that constitute what they called the “form of the object.” In its totality, it includes some twenty additional visual intentions (the exact number varied from author to author): distance, spatial disposition, bodiliness, shape, size, continuity, discontinuity, number, motion, rest, transparency, opacity, darkness, roughness, smoothness, shadow, beauty, ugliness, similarity, and difference.⁵¹ An object is perceived properly only when all these properties are perceived, and Alhacen calls the process that makes us aware of them “perception by means of visual scrutiny.” However, he makes clear that we do not need to actually perceive all of them in every case if the object is known to us from a previous encounter. In that case, our visual system picks up the most salient features of the object and proceeds to identify it on the basis of them. Significantly, Alhacen never provides an example of what these salient features are, probably because he realized that it could easily turn into a discussion about which salient features are distinctive for a given kind/individual rather than about the principled justification for this kind of perception.

Perhaps the most important element in this model is that visual perception always includes assimilating the incoming species of the object to a previously acquired form, so that the thing currently in view is perceived (or identified) as it really is—either as a certain individual thing, a representative of kind, or both.⁵² Whenever the conditions of transmission fail, this has inevitable consequences downstream in the process, meaning that the reception of inaccurate information will result in misperception. So, for instance, when someone known to the perceiver (say, Juhana) is seen at a great distance, the perceiver may fail to recognize him and mistake him for someone else (say, Filipe). Incommensurate distance results in misidentification, which is an erroneous judgment of identity,⁵³ in this case concerning an individual (Filipe rather than Juhana). But the same applies to the failed recognition of a kind, for instance when one confuses a donkey and a horse from a distance.⁵⁴ Yet, in other cases, it is both:

A threefold error occurs in the case of trees: according to individuals, according to common forms, and according to both. Hence, one almond tree is sometimes judged to be another one; or from a great distance a large pear tree sometimes appears to be an almond tree; or at times Peter's pear tree appears to be Martin's almond tree.⁵⁵

Alhacen applies the same principle to the case of inferential reasoning. Perceiving something that is not really moving as being in motion, because something else moves near to it—like the moon behind thin clouds or a stick under moving water—is the consequence of immoderate distance.⁵⁶ Similarly, objects far from each other can, when seen at great distance, be judged as being contiguous to one another.⁵⁷ This misjudgment falls under the category of perceptual inferential errors because distance can only be perceived by means of inference—so, all visual perceptions that depend on the perception of distance depend on inference.

Misperception can also result from a faulty spatial disposition, which leads to the cognitive power judging incorrectly about the size, shape, and even color of the object.⁵⁸ This occurs when the object is tilted or inclined. Moreover, if the perception of an object—its form—is based solely on the perception of the parts that are visible to the perceiver, rather than on the all perceptual parts, the final perception will be inaccurate.⁵⁹ That is the case with objects with many equal sides facing the perceiver, which, when perceived at a great distance, will be perceived as being round because the corner segments will not be perceived.⁶⁰ Alhacen probably had in mind the square tower example, although he only refers to this example in the context of the incorrect perception of size.⁶¹ A later perspectivist, Roger Bacon (1214–1292), illustrates this problem with the example (also found in Alhacen) of a solid and colored object seen through a thin multicolored cloth: if the spaces between the threads of the cloth are sufficiently large, then the perceiver will be able to distinguish between the color of the partly absconded object and the colors of the cloth itself, but if the openings in the cloth are very small, the color of the object will get mixed with the colors of the threads and thus be misperceived.⁶²

Similarly, distance (proportional to the size of the object) also leads to a failure in distinguishing between parts of an object, or else leads to a judgment that there is a division when there is in fact none. For instance, if part of a distant wall has been painted black, we will perceive a gap in the wall, a hole, or a discontinuity, none of which actually exist in the wall itself.⁶³ Now, whereas in some of these cases it seems that there is no erroneous judgment but that things are simply perceived as being a certain way, other cases make it clear that perceptual error is the result of a faulty inferential procedure. This is well illustrated in the case of the misperception of motion due to an inordinate distance. Imagine, Alhacen asks the reader, that you move in the direction of the moon and, despite your speed, you never seem to get closer to it. Thus, you infer that the moon is moving away from you at least at an equal speed. The premise behind this inference is taken from your experience with everyday objects: if you move in the direction of a static object, e.g., a tree, you get closer to it; if you do not get closer to that particular object, then the object must be moving away from you.⁶⁴ The misperception is the result of an unconscious inference from premises known to the perceiver (*ex propositionibus iam dudum animo notis infertur sillogistice motio*) and applied incorrectly due to the incommensurate distance to the object.⁶⁵

Alhacen's list continues, but for our purposes it suffices to note that for him perception is riddled with the potential of failing to grasp things as they are. Alhacen seems to indicate with his lengthy investigation into the topic that the optimal conditions for perception are so

stringent that they cannot always be met, thus making perceptual errors a frequent part of our everyday experience. It is here that we find what is probably the major difference between the perspectivist and the Aristotelian model of visual perception: the former is concerned with making error an inevitable and, thus, important part of a theory of perception, and likewise with providing a basic explanatory framework that applies to all sorts of cases of misperception.

Skeptical worries

As we have seen above, medieval thinkers assumed that no particular justification is needed for the veracity of perception. If external conditions are right and the internal senses operate as they should, the resulting perceptual experience will make the perceiver aware of things as they really are in the world. However, in the early fourteenth century some authors started to question whether perception justifies a belief in the existence of the perceived object.

Skepticism about perception had never been completely absent from philosophical discussions (Lagerlund 2010), but it rose to a new height when Peter Auriol (1280–1322) presented his novel theory of cognition, in which sensory illusions have a central explanatory role. Authors such as Walter Chatton (1285–1343) and Adam of Wodeham (1298–1358) criticized his theory by arguing that it gives us no firm ground to claim that perception is ever reliable. In the context of the present essay, the interest in this dispute is twofold. First, it reflects a major change in the nature of the discussion about perception, a move away from the transmission of information via species and toward a development of more robust representationalist theories of perception under the guise of intentional cognitive acts. Second, as many modern scholars have pointed out, it reveals a shift in the largely unquestioned traditional belief in the reliability of perceptual experience under normal conditions.⁶⁶

Peter Auriol's theory is based on the idea that if we understand the mechanism of illusions we are in a better position to understand how veridical perception takes place because of the fact that these two cognitive processes share a fundamental feature: with both of them, something appears to the subject. Auriol's original aim was to show that the intellect is a formative power, one capable of putting its object in what he calls the "apparent being" or "intentional being" (*esse apparens, esse intentionale*), and for that reason he compares it to the senses. His argument is that if the external senses are capable of forming or producing the thing cognized in apparent or intentional being, then the intellect is much more capable of doing so.⁶⁷ Perceptual illusions are extreme, but illustrative examples of the formative capacity, because they show that our senses are capable of producing such intentional being even when the thing is not as it appears to be—that is to say, when there is a difference between the real extramental being of the thing and the way it appears to the perceiver.

Auriol makes this appearance the defining feature of cognition.⁶⁸ According to him, cognition means nothing more than that some *X* appears to subject *S*.⁶⁹ Though he develops this idea by considering altogether eight different perceptual illusions, the most important for our purposes are the four following perceptual illusions.

- 1 From a moving boat, the trees on the shore are perceived as moving.
- 2 If a (burning) stick is moved in a circular motion, one perceives a circle (of fire).
- 3 A half-submerged stick in water is perceived as bent or broken.
- 4 Sometimes the feathers on a pigeon's neck appear to be colored.⁷⁰

None of these examples are new, but the role that Auriol gives to them in his theory is original. In all of these cases, there is no doubt that we objectively perceive these properties, but the perceived property does not exist in the object, at least not in the way that it appears to be. In his view, what we perceive is the appearance of a thing or a thing having an apparent and intentional being.

For Auriol, then, whatever appears to us in the case of illusions has an apparent being, in other words, the thing as it appears to me. He extends this observation to the cases of veridical perception. When a tree is in front of me and my eyes are open, my act of vision puts the tree into apparent being, and this explains why I become aware of the tree. This apparent being is simply the result of the cognitive power's bringing the object into focus. As Dominik Perler puts it, it is nothing other than "the real thing itself insofar as this thing assumes a certain function, namely to be the intellect's object" (1994: 84). Perler writes about intellectual cognition, but the same process also takes place when something is perceived through the external senses. As a matter of fact, all cognitive powers of the soul function in the same way, and it makes no difference whether the object is really present or not or whether it really is such as it appears to be. Auriol makes this point clear when he describes how external senses and imagination are formative powers: they put the thing in apparent/intentional being, as, for instance, "when my father is imagined by me, he is put in intentional being" (*I Sent.*, I.3.14, 697–698).⁷¹

It is not difficult to see why this theory prompted later thinkers to criticize that it leads to extreme skepticism. They took Auriol's apparent being to mean that cognitive powers create internal representations that function as objects for the cognitive powers. In a sense, their criticism seems justified because, for Auriol, the difference between veridical and nonveridical perception is that in the former both the object and the representation are present whereas in the latter only the thing in apparent being is present, although we believe that we are perceiving an external object. In that case, so the argument from illusion goes, should we not conclude that both in veridical and nonveridical cases all we perceive are the internal representations? In other words, Auriol's theory explains veridical perception of an unmoving stick and nonveridical perception of a circle in the air made by a rotating stick exactly in the same way. The circle I see is not really there, but it appears to be there because my sense of sight puts it (whatever this "it" is) into apparent being. Likewise, my sense of sight puts the unbent and unmoving stick into apparent being. What grounds the difference between the two cases?

The objections by Walter Chatton and Adam of Wodeham stem precisely from the fact that Auriol's theory does not seem to provide any way to distinguish between nonveridical and veridical perception. Whether these worries were grounded in a correct interpretation of the theory has been the subject of intense scholarly debate. Dominik Perler, Russel Friedman, and Han Thomas Adriaenssen have all emphasized Auriol's realist tendencies.⁷² According to them, the thrust of his account is precisely to reject the existence of any sort of mental representation that would be the object of perceptual experience. Supporting their reading is Auriol's claim that the apparent being is not a species, since if it were then the cognitive power would have to be reflexive and the species (rather than the external thing) would be the immediate object of the cognitive act.⁷³ It would be an internal representation that constitutes a veil or a blindfold (*pallium*), which prevents our having access to the external world. Auriol is explicit that in that case, "knowledge (*scientiae*) would not be of things but of such idols."⁷⁴

The reason why perception is about an external thing rather than about the thing in apparent being is that the thing in apparent or intentional being is not something absolute

and real but rather something that has only a diminished being.⁷⁵ Moreover, Auriol notes, the soul does not distinguish between the thing in apparent being and the thing in real being—much in the same way as an internal representation and an external thing (which is perceived by means of the representation) cannot be distinguished in Augustine’s trinity of the outer man.⁷⁶ As Friedman puts it, “it is intrinsic to each and every thing to have two different modes of being: real or extramental being on the one hand, and intentional or objective being on the other” (2015: 144). Their different modes of being do not stand in the way of cognition because they are one and the same (*sunt idem*).⁷⁷ The numerical unity makes Auriol’s theory a version of direct realism: there is only one thing, the real extramental object. This object has a real being in and of itself, but it also has a potentiality for apparent being—a potentiality that can be actualized by a cognitive subject.

The problem with this interpretative line of reasoning—and with Auriol’s own explanation—is that it works perfectly well *in the case of veridical perception*, as there is a thing with a real being that is put into apparent being. Things seem more complicated in the case of nonveridical perception. Scholars such as Perler have argued that this does not alter the general picture, as perceptual errors simply denote a defect in the apprehension of the extramental thing (“a distorted perception” is how Perler puts it [1994: 85]). But this does not explain much: an explanation should say *why* we fail to apprehend how things are. Why do certain cognitive processes result in a distorted perception while others do not? This issue is particularly pressing in the case of Auriol because the whole point of making the object of a cognitive act be a thing in its apparent being arises as a way to explain illusions and veridical perceptions *by the same process*.⁷⁸ The problem in Auriol’s account is that he takes the thing in apparent being to be the way the world is presented as being, when there is a world that is that way. But there is no way to know, on the basis of the experience itself, whether its content corresponds to the way things are beyond the way they appear to be. In fact, it is even difficult to understand whether it is possible to have access to the knowledge by which power (sense, imagination) is putting the thing into apparent being in a given situation.⁷⁹

Consider Auriol’s examples of the stick. It is easy to accept that the apparent being of the stick is numerically one with the real being of the stick when the content of perception is identical with reality. To put the stick into apparent being is simply to make it appear to me, and this process is grounded in there being a stick in the first place. But how about the perception of a circle created by a rotating stick? Auriol argues explicitly that the circle that appears in the air does not have a real being in the stick, as that would mean that the stick is circular. So, if the process is the same both in nonveridical and veridical perception, then the circle that appears is the *esse apparens* either of (1) the stick or of (2) a nonexistent circle. If it is the apparent being of a nonexistent circle, then at least some cases of nonveridical perception are in fact cases of the perception of nonexistent things. On the other hand, if it is the apparent being of the stick, then Auriol would need to explain what grounds a thing’s appearing to the subject in one particular way rather than in another when the thing is other (straight) than how it appears to be (bent or broken when submerged in water, or circular).

In order to account for this difference, one would have to suppose that the object, for instance the stick, must have, in addition to its real being, as many potentialities for apparent being as there are ways in which it can be perceived. Such a theory would be committed to the view that the real being of the object is numerically identical not only with the veridical apparent being, but also with every nonveridical way in which it can appear to be—there would be a numerical unity without a formal unity, so to speak. A stick would need to have the potentiality, actualizable via cognitive power, to appear as being broken, as being a circle, and so forth. How many such potentialities would it be necessary to posit? Furthermore, and

perhaps more importantly, we may ask what the metaphysical grounding of these potentialities is. It seems doubtful that all possible apparent beings would be numerically the same as the real being of the stick. That would be like saying that every object has the potentiality for appearing to be in all the ways it is not. Auriol's theory seems to lead to this problematic conclusion.

In light of these issues, it is quite legitimate to ponder whether Chatton's and Wodeham's criticism is justified. So long as Auriol does not provide any explanation for the difference between veridical and nonveridical perception, it seems only fair to ask whether we are justified in believing that any given experience is veridical. As we understand it, Auriol's theory is unable to do this, and thus it is difficult to decide whether subsequent critiques of his view hold any water.⁸⁰ If all I have primary access to is *X* appearing to me, I am in no position to know whether *X* really is as it appears to be—and ultimately whether there is an *X* out there in the first place. I can never know for certain what causes a thing to appear to me as being such and such.

Auriol's analysis of misperceptions differs from the earlier authors that we discussed above, not only because he considers perceptual errors to be paradigmatic cases that help us to understand what perception (or in general, cognition) is but also because he offers no explanation for them. When we see a circle or a bent stick, no transmission errors take place. But, according to Auriol, our cognitive apparatus does not make a mistaken judgment either. It seems to us that his critics were partially puzzled exactly by this inability to locate the problem. If we cannot tell, even theoretically, where the "mis-" in misperception arises from, are we really in a position to say that veridical perception is reliable? Although Auriol may have had a ready answer to this concern, he does not reveal it, and thus it is understandable that certain skeptical worries emerge in relation to his theory.

Conclusion

By providing a systematic overview of medieval discussions concerning perceptual errors, this paper shows that late medieval philosophers took the difference between veridical and non-veridical perception seriously and that they were aware of the need to provide theoretical explanations for the latter. Although their explanatory framework was quite different from ours, they nevertheless grappled with similar phenomena as are present in our experience of and relation with the external world. They knew, as we do, that things are not always perceived as they really are, and in order to retain the ultimate trust in the senses, they entered into a systematic specification of the conditions under which experiences can safely be assumed to be veridical.

Our analysis is based on a distinction between two major kinds of problems that may hinder veridical perception: problems of transmission and problems of judgment. The boundary between these two groups is not always clear, because the concept of "judgment" is highly versatile in the hands of medieval authors. It is not always clear what should be included in perceptual judgment and the extent to which the operations of the different cognitive powers involved in perceptual processes are distinct from each other. The concept of judgment was used to refer to operations of the external senses, the internal senses, and the intellect, and from this perspective some transmission errors seem to belong to this group.

However, by using this division as a heuristic tool we have hopefully been able to show that medieval authors gave different explanations for different kinds of perceptual errors. On the one hand, they elaborated on environmental conditions (a transparent and properly illuminated medium with no disturbances to it), on conditions of the object (proper size,

opaqueness, the correct position relative to the perceiver), and on conditions of the perceiver's bodily sense apparatus (organs must be in a proper state and healthy). On the other hand, many conditions that they discussed concerned the general state of the perceiver, their emotions, and the more complex functions of the whole psychological apparatus, as well as previous experiences that allow them to recognize and classify things around them more easily.

Despite their interest in perceptual errors, medieval authors were generally optimistic about the reliability of the senses because they thought perception was explainable in the same way as any other kind of change: by being grounded on the nature of things. They thought that we are usually capable of distinguishing perceptual errors from cases in which there are no problems, and that most of the time we can trust the accuracy of our perceptions. Only when our ability to check the conditions themselves (via other senses, reason, experience) is hindered are we utterly misled by them. This realistic framework was questioned, to some extent, by Peter Auriol. Regardless of how the details of his theory are understood, it constitutes a new way of regarding perception that went against many traditional theories of perception. It was based on the assumption that there is no difference between veridical and nonveridical perception when it comes to the mechanism of perception. His critics, Chatton and Wodeham, charged him with opening the gate for skepticism to enter in. They tried to return to the traditional model by claiming that we can locate the problem in the process of judgment. But the field had already changed.

On the other hand, explaining misperception by appealing to errors of judgment may be nothing more than naming them. Even if the ultimate explanation for perceiving things as being different than they are in reality is based on the activity of the common sense—in combining elements incorrectly—we may still ask *why* it does so in some cases and not in others. It seems that perspectivist theories give a plausible answer to this question: our previous experiences explain why we sometimes misperceive things. This idea is inbuilt into the Aristotelian view too, but one might claim that perspectivists provide a more developed picture.

Analyzing medieval theories of perception from the point of view of the explanations that they give for problematic cases sheds light on them from an interesting perspective. It allows us to see more clearly the limits of these theories and to point out certain fundamental philosophical presuppositions that underlie them. Occasionally focusing on the negative reveals the positive more pronouncedly.

Notes

- 1 The authors are listed in alphabetical order, and both are the principal authors. José Filipe Silva is the contact author. This research has been funded by the European Research Council under the Starting Grant Agreement no. 637747 for the project Rationality in Perception: Transformations of Mind and Cognition, 1250–1550 (Silva) and the Riksbankens Jubileumsfond (Toivanen).
- 2 For a general overview of Aristotelian theories of perception in the Middle Ages, see Knuuttila 2008; for an overview of active theories of perception, see Silva 2014.
- 3 The nature of this information and the manner in which the perceiver acquires it can be, and has been, understood in various ways in the period under consideration, but that is not the focus of this paper.
- 4 In the present context, we will not consider cases where nonexistent things are cognized. That is to say, we focus on perceptual errors and illusions, and we rule out hallucinations and dreams, which are not episodes of perception proper, since the perceiver is not in a relevant causal relationship with any external object. This condition is emphasized in Johnstone (2015: 322–323).
- 5 See also *De anima* II.6, 418a7–17; *De anima* III.6, 430b29–30; *DS* IV, 442b8–10; *Metaphysics*, IV.5, 1010b1–3; Lloyd (1968: 194). Medieval authors usually understood this along the lines of Averroes' interpretation, that sight does not err whether it is seeing white or black, and hearing does not err whether it is hearing a high or low voice (1953: 2.63, 224–225).

- 6 For a defense of a reading that Aristotle admits misperceptions also when the conditions are not optimal, see Johnstone (2015: 313–319); see also Charles (2000: 118ff.).
- 7 This attitude has been dubbed “epistemic optimism” (Adriaenssen 2017b: 249–246). See also Perler (2014).
- 8 A distinction between two kinds of judgments (discrimination in the external senses and judgment at the higher level) is often made in the secondary literature. See, e.g., Ebert (1983: 181–193); Corcilius (2014: 31–53).
- 9 “Patet igitur sensum circa sensibilia propria non errare; sic enim est visus coloris et auditus soni et gustus saporis [...] Tactus autem plures habet differentias, quae non ad unum proprium sive commune genus reducuntur, tamen in unaquaque iudicat de illis et non decipitur. In compositione tamen sensibilibus magna frequenter est deceptio sensum non contingit errare circa proprium sensatum. [...] Et causam huius infra dicemus esse quoniam sensus proprius non habet componere, sed aliqua superior potentia, et illius est error.” (*De anima*, II.3.5, 103.) See also Thomas Aquinas, *Summa theologiae*, I.17.2.
- 10 On this, see Smith (2015: 316–321).
- 11 “nihil agat in distans nisi prius agat in medium; sed sensibile distans a sensu agit in sensum, igitur prius agit in medium. Illud autem causatum in medio est species, igitur etc. Minor patet per Aristotelem et Augustinum, qui dicunt quod sensibile agit in sensum.”
- 12 On Ockham’s rejection of the species, see Tachau (1988: 130–135).
- 13 Thus, *species* in this epistemological sense should not be confused with the taxonomic term that refers to different species under a certain genus.
- 14 Although generally accepted, this theory was also criticized. Peter Olivi and William of Ockham are the most well-known critics of the species doctrine. For a discussion, see Pasnau (1997: 161–194); Tachau (1988: 3–81); Toivanen (2013: 115–222).
- 15 The famous dispute concerning Aristotelian philosophy of the mind focuses on the nature of this change. See Nussbaum and Rorty (1992).
- 16 “spiritualius esse est coloris in medio quam soni et iterum spiritualius est esse soni in medio quam odoris. Et ideo ventus non aufert vel affert colores, sed bene obtundit auferendo sonos in parte et non in toto; odores autem et affert et aufert in toto, sicut dicit Avicenna et veritas per experimenta attestatur” (*De anima* II.3.6, 106).
- 17 “Alia suppositio est quod de unoquoque simplici existente melius iudicamus quam si esset alteri commixtum. Unde quando lumen solis transit in mane per fumos a terra elevatos, non iudicamus bene de eius luce seu de eius claritate, sed apparet nobis rubeus” (John Buridan, *Quaestiones super De sensu*: q. 21, 39rb); Toivanen has emended Lokert’s edition with readings from two manuscript sources, which are listed in the bibliography. For stained glass, see, e.g., Peter Olivi (1922–6: *Summa II*, IV, q. 37, 667; V, q. 58, 506).
- 18 “[E]t similiter laborantibus, id est febricitantibus, omnia videntur esse amara, propter hoc quod sentiunt per linguam plenam humiditate huiusmodi, scilicet cholera amara.” See also Thomas Aquinas, *Summa theologiae*, I.75.2; 85.6, and Aristotle, *De anima*, II.10, 422b7–9.
- 19 One possible way of reading the explanation, which is based on the tongue being filled with bitter moisture, is that it refers to an error due to the medium, not the organ. If the idea is that the taste of an object is transmitted to the organ (tongue) via saliva, and the saliva of a sick person is bitter, then the case is similar to a sun that is seen through fog: the medium affects the quality that goes through it. Medieval authors were not clear on this point, as they usually just said that the tongue is filled with bitter moisture, without explaining in detail whether they meant the saliva on the surface or moisture inside the tongue.
- 20 “Secundum quod unus et idem sonus videtur esse concinnus uni audienti et absurdus alii, non est propter naturam ipsius soni, immo propter diversitatem dispositionum in audientibus [...] Si autem audiens sit in debita consistentia existens, debite temperatus, debitam proportionem et commensurationem humorum habens, videbitur ei sonus concinnus, et erit ei delectabilis cum dispositione audientis propter adequationem ipsius in commensuratione; et ille idem sonus in eadem equalitate existens erit inconcinnus homini intemperato.”
- 21 Boethius’s influential work *De institutione musica* conveys this view in the form of a story about how Pythagoras found the mathematical ratios of harmonies. See Boethius (*De institutione musica*, I.10, 196–198; 1989: 17–19). For the historical reception of Boethius’s theory, see Bower (2008: 136–167); Dyer (2009: 177–204).
- 22 Olivi (1922–6: *Summa II*, V, q. 70, 633); Toivanen (2011, 428–435).
- 23 “Si enim digitus supponatur oculo, ita quod situs oculi mutetur, unum duo videbitur [...] unde si tunc supponamus illum esse detentum, ita quod non contradicat ei quod apparet, tunc in veritate dicet

- unum esse duo, et decipitur. Si autem non sit detentus, sed iudicet esse simulacrum in sensu tantum et non in re existens, tunc non decipitur: quia non videtur ei esse verum secundum rationem quod apparet in sensu.” For a discussion on this point, see Thomsen Thörnqvist (forthcoming).
- 24 “Solutio potest dici quod si hoc apparet magis album et illud magis nigrum, non sequitur quod aliquod illorum perfectius sentiatur, quia forte hoc apparet plus album quam sit et illud plus nigrum quam sit, et hoc esset decipi et non perfecte sentire.”
 - 25 The idea may originate in perspectivist theory. Bacon refers to the *Perspectiva* and writes: “Si vero sunt sensibilia diversarum specierum ut album et nigrum, tunc intelligendum est quod opposita juxta se posita magis apparent [...] quoniam si sint equales quilibet apparet major quam sit et quam quilibet per se apparet. Et si sint inequales, ut major albedo minor nigredo, tunc illa nigredo non occultabitur quin videatur, set major videbitur quam sit et quam per se esset, et quia tunc illa nigredo non apparebit secundum esse suum proprium set secundum esse majoris, et ita quasi occultatur esse ejus proprium, licet major nigredo appareat” (*Liber de sensu et sensato*, c. 24, 123). He continues by pointing out that grey spots appear as black against a white background and as white against a black background. Their real color can only be seen when they are in a body that does not have any strong color (*Liber de sensu et sensato*, 123–124). Note that Bacon considers this as a case in which two colors obscure each other, but in a special way.
 - 26 On the first aspect, see Lindberg (1976: 132–133); on the second and further references, see Silva 2017. This joint venture is made particularly clear by John Pecham, one of the most read medieval perspectivists, in his *Perspectiva communis* (1970: I, 56–57, 136–139).
 - 27 On Alhacen’s theory of visual perception, see Sabra (1978: 160–185); Smith (2015).
 - 28 *De aspectibus*, III.2.50.
 - 29 On this threefold level of perception, see Silva (2017). All references are to Mark Smith’s edition and translation.
 - 30 For Alhacen, the perception of the size of an object is the result of collating distance and visual angle (see, e.g., *De aspectibus*, III.7.16). Since the transmission of visual information continues beyond the eyes up to the ultimate sensor (*ultimum sentiens*, the name he uses for the perceptual capacity), one could suppose that this distance also counts for the overall distance between object and perceiver, but Alhacen denies that this is the case (*De aspectibus*, III.7.25). The justification is that this internal pathway is not covered by the visual rays, and thus cannot be measured. Distance in turn is perceived from the relative spatial disposition of bodies in the visual field (*De aspectibus*, III.7.64).
 - 31 *De aspectibus*, III.3.8; and *De aspectibus*, III.4.5 and III.5.4, respectively.
 - 32 “Thus, when each of the conditions that have been listed falls within its proper range of moderation, the true form of the visible object will appear as it actually exists.” *De aspectibus*, III.3.34, 593.
 - 33 For a general overview of medieval theories of the internal senses, see Di Martino (2008); Toivanen (2013, 225–245).
 - 34 E.g., when Thomas Aquinas discusses the possibility of comparing two perceptual qualities that belong to the same genus—e.g., white and black—to each other, he writes that: “Est etiam aliud considerandum, quod sensus et intellectus non solum recipiunt formas rerum, sed etiam habent iudicium de ipsis; iudicium autem de contrariis non est contrarium, sed unum et idem, quia per unum contrariorum sumitur iudicium de alio” (*Sententia Libri de Sensu et Sensato*: 18, 99b217–222).
 - 35 “hoc mobile esse nigrum et hoc rubicundum esse acidum.”
 - 36 See footnote 7 above.
 - 37 “In compositione tamen sensibilibus magna frequenter est deceptio, sicut quid est quod est coloratum, ut utrum croceum sit mel aut cholera citrina aut ubi est coloratum aut quid est, quod sonat, aut ubi sonat, et sic de aliis. Et causam huius infra dicemus esse quoniam sensus proprius non habet componere, sed aliqua superior potentia, et illius est error.”
 - 38 “Est autem aliud sensibile, ut haec individua demonstrata sentire accidit sensui, quod vocamus sensibile per accidens, et in illo incidit mendacium in sensum, quia illud est per compositionem et divisionem sensibilis per se ad aliud quod non accipit sensus, et aliquando componitur vere, aliquando autem falso. Visus enim albi non mentitur, quod album sit; inquantum autem album dicit esse hoc vel illud per affirmationem vel negationem, saepe mentitur.” (*De anima*, III.1.8, 175.) The example of a yellow substance that is perceived as being sweet/bitter comes from Aristotle (*De aspectibus*, III.1, 425a30–b4; *Sophistical Refutations*, V, 167b4–5) and Avicenna (*Liber de Anima Seu Sextus de Naturalibus*, IV.1, 7–8). For a recent analysis of Avicenna’s position, see Kaukua (2014: 99–116).
 - 39 “In visione autem corporali sepe fallitur anima, cum in ipsis corporibus fieri putat quod sit in corporeis sensibus: sicut navigantibus videntur moveri que stant in terra; et intuentibus celum sidera stare que

- moventur; et divariatis oculorum radiis, res una habere duas formas, ut unus homo habere duo capita, et in aqua remus fractus, et multa huiusmodi” (*Summa de anima*, II.2.65, 193.)
- 40 *De sensu*, VII, 448b12–14; *De aspectibus*, III.3, 428b2–4. Four cubits is about 1 foot (the size of a football).
- 41 “licet enim circa compositionem coloris cum subiecto vel divisionem ipsius ab ipso contingat error, tamen circa colorem numquam est error. Visus enim semper rubeum dicit esse rubeum, componere autem rubeum cum hoc subiecto quod est cuprum, vel cum hoc subiecto quod est aurum, non est visus, sed sensus communis, ut infra habebitur. Et circa illam compositionem et divisionem frequenter contingit mentiri; multi enim cuprum crediderunt esse aurum, et multi mel fel putaverunt, eo quod citrinum est utrumque.”
- 42 “quaecumque virtus comparat inter sensata plurium, oportet, quod accipiat sensata plurium; et hoc non potest facere aliquis sensus proprius. Et quia hoc non est proprium alicuius sensus particularis, ideo frequens fit deceptio circa hoc [...] quia saepe, cum accipit citrinum, hoc ipsum putat esse amarum, et ita mel aliquando opinatur esse fel.” (*De anima*, II.4.6, 156.)
- 43 The conscious judgment, or perceptual belief in the robust sense, is not a perceptual judgment of the kind that medieval thinkers took common sense to be responsible for; rather, it is an intellectual judgment. Sometimes there can be a conflict between the two kinds of judgments. For instance, in the case of the famous Müller–Lyer illusion, we perceive one line as being longer than another, although we know that they are both equally long. It is extremely difficult to let our conscious judgment concerning the relative lengths of the lines affect the perceptual involuntary judgment, which is, according to medieval authors, made by the common sense.
- 44 On Aristotle on bile, see Aristotle (*On the parts of animals*, 288).
- 45 Nonhuman animals cannot form propositional thoughts, but they are capable of making these kinds of perceptual errors. See, e.g., Aquinas (*Sentencia libri De anima*, II.13, 121b–122b); Pasnau (2002: 271). A useful discussion and references can be found in Oelze (2018: 52–87).
- 46 “trepidum decipitur in timore existens, et amans decipitur in amore vehementi existens, in tantum ut etiam propter modicam similitudinem videatur timenti quod videat hostes, et amanti videatur quod videat dilectum” (*De somno et vigilia*, II.1.7, 167a).
- 47 According to medieval authors, emotions involve both cognitive and physiological aspects. For instance, anger is a desire for revenge or punishment, which is accompanied with boiling blood around the heart. This description originates in Aristotle (*De anima*, I.1, 403a25–b19), and it was commonly accepted in the Middle Ages. See, e.g., Aquinas, *Summa theologiae*, II-1.22.2; 44.1; 37.4. On medieval theories of emotions, see Knuuttila (2004).
- 48 Animal spirits were thought to be a special type of highly refined physical matter, which is prepared from blood and which moves in the three chambers of the brain and in the nerves. In medieval medical theory (which was also used by philosophers), it was the physiological carrier of psychological powers and functions (see Harvey 1975).
- 49 “febricitantibus quibus materia vaporat ad caput, videtur quod animalia videant in parietibus propter modicam similitudinem linearum casu protractarum in parietibus: et quidem taliter infirmantium quibus non detinetur rationis usus, vehementer decertant apud se contra phantasmata, scientes esse falsum [...]. Si autem maior sit passio infirmitatis, in tantum quod detineat rationem, tunc movetur ab ipsa similitudine irascendo, vel timendo, vel concupiscendo, sicut re praesente.”
- 50 *De somno et vigilia*, II.1.7, 167b.
- 51 II.3.44.
- 52 III.6.2.
- 53 III.6.4–5.
- 54 *De aspectibus*, III.6.6.
- 55 “Pari modo accidit error in arboribus triplex: in individuís, in communibus formis, in utrisque. Unde aliquando una amigdalus extimatur alia; aliquando a longitudine magna pirus magna apparet amigdalus; aliquando pirus Petri apparet amigdalus Martini” (*De aspectibus*, III.6.6, 297, transl. 597.)
- 56 *De aspectibus*, III.4.7.
- 57 *De aspectibus*, III.7.2.
- 58 *De aspectibus*, II.7.13; *De aspectibus*, III.6.10.
- 59 *De aspectibus*, III.7.1.
- 60 *De aspectibus*, III.7.9; see also III.7.164–165.
- 61 *De aspectibus*, III.7.193–194.

- 62 Roger Bacon (*Perspectiva*, II.3.2, 206–207). For Bacon, who adopts the threefold classification of visual perception, this case corresponds to an instance of perceptual recognition (i.e. perception by means of prior knowledge).
- 63 *De aspectibus*, III.7.26.
- 64 The object can move either at the same speed as you, in which case the distance remains the same and the object's apparent size does not change, or it may be moving faster than you, which means that it looks smaller and smaller. See *De aspectibus*, III.7.32.
- 65 *De aspectibus*, III.7.33.
- 66 See, e.g., Denery (2005); Perler (2014).
- 67 Tachau (1988: 93–94). Auriol writes, e.g., that: “The act of the external sense puts the thing in intentional being” (“actus exterioris sensus ponit rem in esse intentionali”) (*Scriptum super Primum Sententiarum*, I.3.14, 696.)
- 68 Friedman (2015: 141–150); Adriaenssen (2017b). Friedman makes a strong case that despite the obvious terminological differences between modern philosophical discussions concerning phenomenological consciousness and Auriol's medieval vocabulary involving the notion of *esse apparens*, the crucial philosophical idea is the same. Adriaenssen approaches the issue from the point of view of skepticism.
- 69 Auriol (*Scriptum super primum Sententiarum*, d. 35, q. 1.1, ll. 320–321, 326–336).
- 70 Auriol (*Scriptum super Primum Sententiarum*, I.3.14, 696–697). The two last examples appear in Cicero (*Academica*, II.7.19, 492–493). Auriol also considers the case of mirror images, but we shall not examine this here—see Lička's chapter in this volume.
- 71 “Cum igitur sensus exterior formativus sit, sic quod ponat res in esse intentionali, et similiter imaginatio idem habeat—nam pater meus imaginatus a me est, ipsemet positus in esse intentionali *I Sent.*, I.3.14, 697–698.”
- 72 Friedman (2015: 144); Adriaenssen (2017b: 82–87); Perler (1994). “considerandum est quod res in esse formato posita non claudit in se aliquid absolutum nisi ipsam realitatem. Unde non ponit in numerum res et sua intentio quantum ad aliquid absolutum, claudit tamen aliquid respectivum, videlicet apparere. Quod non debet intelligi ut affixum aut superpositum illi rei, sicut ceterae relationes, sed omnino intrinsicum et indistinguibiliter adunatum” (*Scriptum super Primum Sententiarum*, d. 27, q. 2, a. 2, ll. 584–588). On the important distinction between the concerns with representationalism and apparent being, see Biard (2007).
- 73 “Tum quia in visu separantur, recipit enim quandoque videns ab obiecto qualitatem illam, quae non est aliud quam visio”; and “actio autem sensibilis et qualitas visibilis idem sunt” (*Scriptum super Primum Sententiarum*, d. 35, q. 1, a. 1, ll. 696–727). See Tachau (1988: 92, 98).
- 74 Friedman (1997: 475).
- 75 Friedman (1997: 477). The notion of mental epistemic entities as having “diminished being” can be found in Roger Bacon (*De multiplicatione specierum*, I.1, 17), and later on Scotus, *Ordinatio*, I, dist. 36, n.33.
- 76 Auriol (*Scriptum super Primum Sententiarum*, I.3.14, 698).
- 77 Friedman (1997: 476). They have different modes of being not least because otherwise our knowledge would be limited to singular things. However, we do not have intellectual knowledge of a particular rose but of a universal one (rose *simpliciter*), and it is the universal which is put into apparent being by the intellect Friedman (1997: 474). See also Friedman (1997: 432).
- 78 Auriol (*Scriptum super Primum Sententiarum*, prol. 2, 199–200). For a discussion, see Friedman (2015); Adriaenssen (2017a).
- 79 To be sure, there is a clear phenomenological difference between perceiving and imagining, but Auriol's theory does not provide an explanation for this difference.
- 80 Adriaenssen (2017a) argues that the criticism was not justified. By contrast, Tachau (1988) and Wood (1982) claim that it was. More skeptical approach to the success of Auriol's theory in warding off the skeptical worries is presented by Denery (2005: 135–136).

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7

WHAT IS IN THE MIRROR?

The metaphysics of mirror images in Albert the Great and Peter Auriol

Lukáš Lička

Catoptrics, i.e. the optical study of mirrors and the phenomenon of reflection, is the main topic of an anonymous late ancient treatise, translated into Latin as *De speculis* in 1269 by William of Moerbeke who (falsely) ascribed it to Ptolemy.¹ In the introduction of this rather brief treatise, the author states that catoptrics is worth studying as it enables its practitioner to construct various kinds of mirrors, including odd ones, such as the one in which the observer's face appears to have three eyes and two noses, and practical ones, such as the one that enables the observer to spy on people in the street.² Such a statement reveals, first, one important feature of the entire tradition of premodern optics: it is not a mere detached study of the propagation of light and its physical properties but chiefly a complex study of what is visible to a beholder, or the whole world of appearances.³ As such, premodern optics is primarily a theory of vision, involving—among others—analyses of psychological mechanisms and even what may be called a phenomenology of vision (first-person descriptions of visual experiences). Second, it testifies to the premodern fascination with mirror images and perceptual ephemera. Whereas modern catoptrics is content with the universal law of reflection, ancient and medieval catoptrical treatises abound with applications to various kinds of mirrors, including very peculiar ones, with the observer's involvement being crucial in all cases. The question is: what appears *to them* in each mirror and how?

In the thirteenth century, the assimilation of Greek and Arab optical texts (mainly those by Euclid, Ptolemy, Al-Kindí, and Ibn al-Haytham or Alhacen⁴) newly translated into Latin goes hand in hand with rethinking the optical ideas and theories by scholars well versed in Aristotelian philosophy. The inevitable result is that many so far understudied questions emerge among the philosophers, such as what is the ontological status of mirror images? And what is the place of mirror perception in the broader theory of vision? The present chapter is devoted to the former question, so pressing for medieval scholars. Thus, the key questions investigated here are: what is or what *appears* to be in a mirror, or, a little differently, what is the perceptual content of a visual experience of an object seen by means of a mirror?

Why is such a question worth exploring? The mirror image, or the scene seen in the mirror, evinces a unique combination of properties not found in the images produced by other optical devices. The object seen by mirrors appears to be elsewhere than it really is. (Similar mislocation is present in photos and pictures but not in the images produced by a

magnifying glass.) Unlike images by cameras and magnifiers, the mirror images are usually perceived as left–right reversed, and, unlike photos (but like images formed by magnifiers), they are not persistent—mirrors cannot “freeze” the scene appearing in them and make the image stable and fixed.⁵

Hence, the mirror image is a peculiar entity that seemingly defies a neat demarcation between the mind and the extramental physical world.⁶ On the one hand, the mirror image seems to be endowed with properties that are generally ascribed to ordinary material objects. For example, it is *localizable*, at least to some extent: it is possible to determine how far behind the mirror the image appears to be. Also, the image seems *public*, i.e. perceptually accessible to more than one observer; it does not seem to be a private mental entity. However, is there a single image appearing in the mirror for every observer? In fact, the image evinces some features commonly ascribed to mental entities. For example, it is mind-dependent at least to some extent, or rather observer-dependent: its location changes depending on the observer’s position; the whole scenery seen in the mirror is reconstituted every time the observer moves. Further, the mirror image is perceptible to one sense alone: unlike everyday objects, mirror images can be seen but cannot be touched.

To investigate the metaphysical nature of mirror images, we can begin with a simple example of mirror perception. An observer is standing in front of a plane mirror and looking into it. She sees her own face, which appears to be behind the surface of the mirror. Now, the question is, what does she see in the mirror? Or, to put it ontologically, what kind of entity does she encounter? Two possible solutions come immediately to mind: either she sees something different from her face, or her own face, albeit in a different place.⁷ Neither of these solutions is self-evident and both comprise some weaknesses.

The former, which may be called “the multiplication account,” suggests that, besides mirror and observer, two different entities are needed for mirror perception: first, the real object and, second, its image or reflection constituted by the mirror. However, this account has several problems. For one, its proponent must explain what kind of entity the image is. Is it a property of the mirror itself? Two, if the mirror image is observer-dependent, what is the exact “physical” way by which the observer “causes” the mirror image? Does it mean that the mirror itself suffers a change every time somebody looks into it? Further, the mirror image is obviously not a stable and fixed entity such as a color painting: it needs to be explained how the mirror image changes according to how the observer’s point of view is adjusted every time she moves.

Alternatively, “the unification account” proposes an ontologically more parsimonious model of mirror perception—there is only the object seen which causally affects the observer, but the causal chain is distorted by the mirror with the consequence that the object of perception appears to be outside its proper place. This account also has some problems. For example, it is not clear how the real object and its appearance in the mirror can be identical if they are distinguishable regarding their position and, as a famous principle states, two entities are really identical only if they are mutually indiscernible. Further, there is an epistemic difficulty: the unification account seems to imply that every instance of mirror perception is *illusory*—the observer is deceived every time they view the mirror. However, we successfully use mirrors for practical purposes on an everyday basis (e.g., when driving a car) and are *not* deceived by them.

This chapter explores how the issue of mirror perception was treated by medieval philosophers. I argue that these two opposite accounts find their medieval expressions in two famous figures of the thirteenth and fourteenth century. While the Dominican thinker Albert the Great (c. 1200–1280) is introduced as a proponent of a version of the multiplication

account, the Franciscan Peter Auriol (c. 1280–1322) advocated a version of the unification account.⁸ The main question is what kind of entity they deemed the mirror image to be. The consequences and troublesome features of both accounts are considered and the solutions to these are collected from their works. Also, the question of how their conceptions of mirror perception cohere with their general theories of perception is addressed.

The Multiplication Account: Albert the Great

The Dominican thinker Albert the Great, active especially in Paris and Cologne during his long and prolific intellectual career, devoted a whole question to the issue of mirror images as part of his discussion of visual perception, its objects and the nature of colors included in his early anthropological work *De homine* (written in early 1240s).⁹ The question also circulated as a separate treatise under the title *De forma resultante in speculo*.¹⁰ Later, Albert also made digressions on mirrors and mirror images in some of his commentaries.¹¹

The sources at Albert's disposal offered two opinions on the nature of mirror images. One relates to the so-called extramissionist theory of vision. According to such a theory (proposed, in Albert's view, by Plato, Empedocles, and Euclid), visual rays issue forth from the eyes, reflect from the surface of the mirror and strike the object. The mirror is perceptually grasped by the incident ray, the face of the viewer by the reflected ray; as both rays are connected in the mirror, the image of the face appears to be there.¹² Hence, the mirror image is the object itself, incidentally appearing in the mirror. Another position is implied in the so-called intromissionist theory of vision which Albert ascribed to Democritus and Aristotle.¹³ According to this theory, vision occurs by the causal influence of the object's form on the sensory organ. Thus, a mirror image must be a form capable of exerting an influence on the observer's eyes.¹⁴

Considering Albert's Aristotelian-minded, persistent and long-term criticism of any hint of extramission in the visual theory, it becomes obvious that he would favor the latter account of the nature of mirror images.¹⁵ After all, the very title of his question on mirror images, *On the Form Reflected in the Mirror*, reveals tellingly which account Albert finds attractive. Thus, in his view, what is seen in the mirror is an accidental *form*—an entity like color or light—and, strictly speaking, not the material object itself. It is justifiable to read Albert as proposing a version of the multiplication account, according to which the mirror image is a more or less independent entity. His reasoning is quite simple: if something is able to perform an action, it is an actually existent entity—and the form in the mirror is able to act upon the visual power and alter the visual organ.¹⁶ In other words, the mirror image is causally efficacious, therefore it is an entity. Briefly, Albert proposes that mirror images are neither material bodies nor substances but *accidental forms* that are in the mirror as in their subject.¹⁷ Again, he presents a simple argument: the image is not distant from the mirror; hence, it is in it as in a subject.¹⁸

The initial intuition that what is seen in the mirror is a form of the object is compatible with Albert's understanding of the (external) sensory powers in general. In accordance with Aristotle, Albert believes that to each sensory power a proper sensible corresponds so that this sensible is not perceived by any other sense—thus, what is colored affects the sight but no other sense.¹⁹ The external senses are distinguished and defined by their respective proper sensibles. Therefore, since to see is nothing else than to apprehend a visible form (color),²⁰ and mirror perception is evidently an instance of vision (as it is not clear what else it might be), what is perceived in such a situation cannot be anything other than a form of color. Hence, a mirror image is a form existing in the mirror just as a color exists in a colored object.

Albert's tentative understanding of mirror images as forms was most likely common among his contemporaries, influenced ultimately by the Muslim thinker Al-Ghazali. Al-Ghazali proposes that to see an object means to have a form of that object impressed in the eye and that the impression of the form in the lens of the eye (or in the so-called crystalline humor) is analogous to the impression of the form in the mirror. Al-Ghazali even suggests that the mirror would *see* the object by means of the latter's form it receives—if only it were animated by a *spiritus*.²¹

However, such a position, if understood as identifying the mirror image with a form *impressed* in the mirror, has several inconvenient consequences, as discussed above. Three of them are worth considering here.²² First, if the mirror image were a real form inhering in the mirror, it would really affect the material structure of the mirror: just as the material structures of a green leaf and a yellow leaf differ so the matter of the mirror would be altered upon the impression of different images. However, such a claim seems counter-intuitive, since, e.g., the mirror does not acquire a real, permanent color when reflecting a colored object. Second, when a color inheres in the surface of an object, it evinces a quantity and stable, measurable dimensions. Mirror images also appear to have a sort of width and length. However, if the mirror is broken, the mirror image is *not* divided into parts. On the contrary, a whole image appears in every piece of the broken mirror. Hence, it does not seem to inhere in the surface of the mirror as a color inheres in the surface of a colored object.²³ Third, if the mirror image inhered in the mirror as an accident inheres in a subject, it would be “attached” to the mirror and would move every time the mirror is moved. However, the opposite is the case: we experience that when the mirror moves, the image stays still. On the contrary, the movements of the image seem to depend rather on the movements of the reflected object.

Aware of these problematic consequences, Albert refines his stance with respect to the nature of the form in the mirror, its generation and its relation to the mirror. Concerning the first problem, he admits that the mirror image is not a full-fledged accidental form inhering in the subject in such a way as to affect it. How is that possible? The Aristotelian version of the distinction between so-called first and second qualities, introduced by Robert Pasnau in a recent paper (2011) may be elucidating here, as it was apparently advocated by Albert, too. Whereas many of the common sensible qualities (color, taste, odor, etc.) are second qualities, there are also four first qualities (warm, cold, wet, and dry, i.e. the qualities of the four elements: fire, water, air, and earth), and second qualities are grounded in the first ones.²⁴ The relation between these two kinds of qualities is a relation of supervenience.²⁵ Thus, color, when it is a real quality inhering in a subject, is a consequence of the combination of the first qualities of this subject and makes this thing really colored.²⁶ However, the form of color can be abstracted from its proper bearer, transmitted through a medium and received in the visual power of a sentient being. In this case, the form of color does not meet a corresponding combination of first qualities (the material structures of air or eyes are different), and, consequently, it does not make its subjects colored but has, as Albert calls it, a mere “spiritual” being in them.²⁷

Albert also uses this conceptual tool in the issue of mirror images. He insists on the claim that a mirror image is a form; however, it is a form with a special kind of being that does not alter the material structure of the subject it inheres in. Hence, the nature of the mirror image is similar to the way a form of color exists in a medium. It is not a color or image in a strict, full-fledged sense but rather a *species* or representation of the color: it contains and transfers information about the color, but it does not actually affect its subject and does not make it really colored.²⁸ Later, Albert calls this special kind of being “spiritual” and presents a more

detailed description of the process resulting in an image appearing in the mirror. He notes that light (which as such also has spiritual being) has the power to abstract a color or an image from its material realization, transfer it and give it a special spiritual kind of being. Since the ray of light cannot penetrate the mirror and carry the image through it, it reflects from it, and the image remains in the mirror.²⁹ Hence, what the beholder sees in the mirror is an entity different from the material object, a form of its color existing in the mirror, not physically (as a color of the mirror) but spiritually (as a representation of the object seen). Albeit existing in a diminished way, the mirror image is still a color and, hence, has the power to affect the sense of sight.

Yet, how is the *species* of color seen in the mirror but not when propagating through the air? Albert does not address the issue explicitly; however, he allows that colors are not generated only in solid objects (where they follow a certain combination of the first qualities) but also in the indeterminate bodies such as clouds, with the rainbow being the most obvious example. Briefly, these apparent and unstable colors are brought about by the workings of light (mainly, its refraction) when it encounters (optically) denser objects (water drops in the air).³⁰

Albert may point to an analogous process takes place in the mirror. The glass surface is transparent just like air and thus capable of transmitting light and *species* of colors. However, unlike air, the mirror also has a solid lead layer in the back that obstructs the propagation. The *species* of color somehow get stuck in the mirror and become manifest to the eye, with the mirror image formation being the result.³¹ According to Albert, the *species* also receive some of the properties of the subject they are received in. So, as the air is shapeless, the *species* received in it do not take on any determinate shape whereas in the mirror, which is only partially transparent and has a determinate shape, the *species* acquire a determinate figure and appear to have proportions.³²

But does the image in the mirror have the proportions it appears to have? This question addresses the second problem pertaining to the quantitative properties of mirror images. Again, Albert uses a similar strategy. Quantity is a property of a compound of form and matter. Thus, dimensions can be attributed to a form only *in so far as* the form inheres in matter. However, the mirror image is not a form in-forming the matter of the mirror—it exists in it as a mere *species* having immaterial being. Therefore, the dimensions it appears to have are only properties it represents.³³ (Albert also speaks about an “intentional” quantity.³⁴)

In fact, the image is received not in the whole surface of the mirror but only in one point.³⁵ The exact position of the point of reception depends on the position of the object represented in the mirror image and can be determined by geometrical optics. Albert can also utilize this claim to explain the fact that the mirror image sometimes appears to be far behind the surface of the mirror, sometimes near to it (a fact often used against a naive impression-theory of mirror images).³⁶ He emphasizes that not only the image is represented in the mirror but also, somehow, the distance between the observer and the mirror. The depth in which the mirror image appears corresponds to the distance between the observer and the mirror.³⁷ Furthermore, as the form appearing in the mirror is received in a point and not in the mirror’s whole surface, the image is not divided into parts when the mirror is broken. Rather, every piece of the broken mirror becomes a new mirror, and the image of the object is received in a point in every of these fragments.

Finally, the third objection to understanding the mirror image as a form concerns the special nature of the image’s movements. Being an accident of the mirror, the image ought to move dependently on the movements of the mirror; however, its movement depends rather on the movements of the object it represents.³⁸ The objection presents a dilemma for a

proponent of the multiplication account of mirror images: he must deny either the understanding of the image as a form in the mirror or the possibility of its movement. Albert deals with the dilemma by making concessions to both of its horns. First, he again emphasizes that the image is not a full-fledged form *inhering* in the mirror and consequently need not move with the movements of the mirror. Second, the image does not *move* in the strict sense at all. Rather, it is generated anew successively in a different place in every moment. Although it appears to be in the mirror, its cause or “producer” (*generans*) is the observer playing the role of the reflected object. The point where it is generated is determined precisely by the positions of the observer and of the object reflected. When the mirror moves, the point of reflection remains stable and hence the mirror image does not seem to move. But when the observer moves, the point of reflection is adjusted anew in every instance and, consequently, the mirror images seems to move.³⁹ Since the continuous generation of mirror images is immensely fast (immediate, actually, as the propagation of light takes no time according to Albert), the mirror image appears to the observer as if it were in motion.⁴⁰

To sum up, Albert can respond to the general objections against the multiplication account of mirror images. A mirror image, albeit not identifiable with the object reflected in the mirror, is not a stable and fixed quality impressed in the mirror like an ordinary image painted on canvas. A mirror image is an entity having a kind of diminished being and resulting from the mutual relations between the mirror, the object reflected in it, and the observer. The scenery seen in the mirror is reconstituted every time the observer moves.

Nevertheless, Albert’s account of mirror perception does not fare particularly well in one crucial aspect: it is hardly compatible with his general account of perception. Albert embraces an Aristotelian theory of perception, modeling vision as a causal process between the visible object (the real quality of color) as an active cause and the visual power that passively receives the influence of the object. As the object and the eye are not spatially connected, a causal intermediary is needed, namely, a *species* or a form having spiritual or intentional being. The object alters first the medium between itself and the observer, and then the observer’s eye, creating a similitude or *species* of itself in the observer’s visual power.⁴¹

Although he rarely specifies his theory in such terms, Albert tends toward a direct realist understanding of *species*. The direct object of perception is the external material thing, not its *species*. The *species* is rather an instrument, an intermediary transferring information about the object or a “principle of cognizing” the object.⁴² The *species* mediates cognition but only in so far as it functions as an information-transmitter not as a consciously cognized representation. In other words, the relation between the cognitive power and the *species* is causal, not cognitive.

Yet, as Albert mentions, mirror images, like pictures or (mental) representations stored in the memory, can be understood in two different ways. On the one hand, grasped in themselves, the images function as independent entities catching the observer’s attention. On the other hand, however, these images can be grasped as mere representations or signs, as something that—although it plays the role of a primary object of cognition—shifts the observer’s attention to what it represents, namely the thing reflected, drawn, or remembered.⁴³ Evidently, the ways *species* and (mirror) images function in cognition are different and perhaps incompatible.

Albert, seemingly unaware that his account of mirror perception is implausible within an Aristotelian framework, faces the following dilemma: either abandon the idea that the mirror image is a form having spiritual being (i.e. the *species*) leaving the metaphysical nature of mirror images undecided; or admit that *every species* can become a primary object of perception.⁴⁴ However, in the latter case it would not be obvious why we are not aware primarily

of the *species* in our eyes and only then of the thing that generated the *species* (just as we are primarily aware of a mirror image and only then of the thing reflected). There is no indication that Albert recognized the tension in his theory of perception, as expressed in the dilemma, or that he attempted to resolve it.

The Unification Account: Peter Auriol

Since acknowledging *species* as direct and primary objects of cognition (i.e. the second horn of the dilemma) was not attractive for Albert's contemporaries (chiefly due to the representationalist consequences of such a claim), some thirteenth-century thinkers tended to embrace the first horn of the dilemma. They abandoned (Albert's) intuition that what is seen in the mirror is a form and endeavored to think the whole issue through anew. For example, adherents of *perspectiva* (or optics), such as Roger Bacon or John Pecham, calling Albert's position "common" or "vulgar," asserted that what is seen in the mirror is the material thing itself and that the alleged mirror image is nothing more than a mere appearance of the thing outside of its place.⁴⁵

Indeed, the perspectivists favor a *unification* account of mirror images (i.e. the mirror image is not a really existing entity different from the material object). However, investigating the metaphysical nature of mirror images was not among the major objectives of the perspectivist inquiry. They focused rather on the issue of determining the *location* of an image in each of the various kinds of mirror using geometry. A genuine interest in the metaphysical dimension of mirror images may be found in the philosophy of perception of the early fourteenth-century Franciscan thinker Peter Auriol.⁴⁶

Peter Auriol was active especially at the Parisian Faculty of Theology in the decade before 1320; hence, his works are mostly theological in their nature. He wrote a commentary on the *Sentences* (preserved in several versions) and held one *Quodlibet*.⁴⁷ His interesting account of sensory perception (and theory of cognition generally) is always presented in a broader theological context. Hence, his account of mirror perception is also not introduced in a single passage devoted primarily to the topic but dispersed in several places of his *Scriptum*.⁴⁸

A consideration of the nature of mirror images is included in Auriol's famous list of sensory experiences, which has been advocated to justify his conviction about the active nature of sensory powers.⁴⁹ The reason why Auriol includes mirror perception in the list is that such an experience (alongside others) reveals the active involvement of the visual power in processing visual information and modeling the perceptual content. Therefore, Auriol's primary objective is to deny any account implying the reification of appearances and rendering them as independently existing and causally efficacious entities that would on their own elicit visual acts in the observer, without the latter's active involvement in such a process. Thus, the most emphasized feature of mirror images is not their causal efficacy, as Albert advocated, but their observer dependency.

Inquiring into the nature of mirror images, Auriol proceeds by eliminating implausible opinions.⁵⁰ First, he focuses on the opinions presupposing that the image is (1) a real entity and, consequently, (2) different from the material object itself. It is worth premising that Auriol uses a rather broad notion of *real* being—existing really (or having *esse reale*), unlike existing intentionally (or having *esse intentionale*), means existing independently of being grasped by the cognitive act of a living cognizer.⁵¹ Therefore, even *species* of color abstracted from the colored object and existing "spiritually" in a medium, as Albert asserts above, are propagated through the medium without the intervention of any cognizer. Therefore, *species* of colors are *really* existent entities in Auriol's view.⁵²

Auriol sketches three different suggestions as to what the mirror image as a real entity may amount to. The first option is a version of the multiplication account we encountered in Albert—the mirror image is understood as a *species*, a real (i.e. observation-independent) quality existing in the mirror as in its subject.⁵³ However, such an account is not viable according to Auriol, since no accident can exceed its subject, but images can sometimes be larger than the mirror (when it mirrors a tower or the heavens). As argued above, Albert would be able to face this objection: in his view, the *species* is not an actual accident inhering in the whole surface of the mirror, and it has no real dimensions but only represents the dimensions of the object. Nevertheless, Auriol points out another deficiency of the view: if the image were a real quality, it would have to penetrate the solid lead substrate of the mirror, since the image appears to be beneath the mirror. Auriol seems to be implying that the physical description of reflection (i.e. the propagation of the *species* and their interactions with media and solid objects) and the phenomenological description of mirror perception (i.e. what *appears* to an observer), although often confounded in Albert's account, are to be differentiated.

Another option is to deny that what is seen is different from the real material object and suggest a naive unification view. The mirror image would then be the really existing thing itself.⁵⁴ Although the view tries to preserve the basic unification intuition, that what we see in mirrors are the real material objects around us, it has highly implausible consequences when the case of self-observation is considered. When someone looks in a mirror, they see their own face beneath the mirror. However, it does not make good sense to infer that this face *really* exists beneath the mirror—it only *appears* to be there.

It may be added that, if the consequences are fully thought out, insisting on the real being of mirror images and reifying these appearances would eventually lead to a bizarre *multiplication* account: the scene seen in the mirror would be an alternative space occupied by really existing *replicas* of the things around us. Speaking about their face seen in the mirror, the observer would in fact refer to a face really existing behind the mirror. Further, mirror perception would be like a normal visual experience albeit grasping objects from the other side of the mirror, and the mirror itself would be a window into another world.

The last option returns to the claim that the image is different from the object but tries to preserve its real being. It points out the “fluid” nature of the mirror image and its partial dependency on the observer and proposes reducing it to something in the observer, namely, their visual act or an entity existing in their eye: a real quality inhering in their sensory soul.⁵⁵ Being identical to the observer's cognitive act, the mirror image would be both a real entity and dependent on observation. Further, the theory would evince the simplicity of the unification account, as nothing more than the material object, and the cognizing subject would be included in the mirror perception. Nevertheless, this notion does not appeal to Auriol, either. His objection refers to the perspectivist practice of investigating the image position in different types of mirrors.⁵⁶ Depending on the type of mirror, the image is formed beneath, on, or in front of its surface, always *outside* the observer and near the mirror. If the mirror image were a mere entity in our eyes, we would not perceive it as if it were in the outer environment, Auriol thinks.

All three options are based on the primary assumption that the mirror images must be entities endowed with real being. However, as mentioned above, a property common to entities existing *realiter* is their independence of being observed. Thus, if mirror images were real entities, they would exist whether someone was watching or not. Consequently, all appearances would have to be reified.⁵⁷ Yet denying that in some cases our cognitive acts are focused on mere appearances without solid ontological foundations (a position Auriol ascribes

to some ancient relativists criticized by Aristotle in *Metaphysics* IV) is philosophically problematic. Strictly speaking, for all possible appearances, whether veridical or false, there would be a special ontologically describable entity, resulting in the coincident real being of mutual contradictories.⁵⁸

The only possible defense against such an “overpopulation” of reality Auriol proposes is to embrace a pluralist conception of being: some entities, such as stones, exist really, i.e. even when nobody is looking at them; while other entities, such as rainbows, exist only in a diminished, observer-dependent way. Mirror images are examples of the latter—they are mere *appearances* of the things reflected in the mirror or the things themselves in so far as they have an “apparent being” (*esse apparens*) in the mirror.⁵⁹

Auriol further asserts that veridical visual acts (even, for that matter, all instances of cognition) also grasp the material object only *in so far* as it appears to them or, in other words, are focused on the “apparent being” of their objects. Thus, one and the same object can appear differently depending on several conditions (e.g., the quality of illumination, or the sanity of the observer’s sensory organs); also, it appears differently to various cognitive powers (e.g., as colored to vision, or as universal to the intellect). The mechanism of cognition consists in receiving a *species* of the object and processing it by the respective cognitive power. The result is a conscious cognitive (perceptual or conceptual) content (or, putting the cognized thing into *esse apparens*), which is based on the information included in the *species*. The *species* then, in turn, becomes a cognitive act inhering in the cognitive power, grasping the respective content.⁶⁰

Yet Auriol is not completely clear as to what this *esse apparens* amounts to, and a whole generation of Auriol scholars are unable to agree on a single correct interpretation of the theory.⁶¹ The point of departure usually is the question whether *esse apparens* is something mental or extramental. In fact, textual evidence for *both* may be derived from Auriol’s works. On the one hand, the *esse apparens* of an object occurs only when it is constituted by a cognitive act. Hence, it is mind-dependent and, *eo ipso*, within the soul.⁶² On the other hand, Auriol stresses that appearances are *outside* observers in exactly the place where they appear to be. Appearances are the things themselves in so far as they appear to us.⁶³ In normal circumstances, appearances are indistinguishably united (*indistinguibiliter adunatum*) to the things,⁶⁴ and the observer does not even notice that there is an appearance of the thing created by their cognitive activity.⁶⁵

This discrepancy could be solved by denying an initial assumption of drawing a sharp distinction between the mental realm and the extramental world, one probably inherited from modern philosophers whose “corpuscularian physics and ... Augustinian psychology pushed them toward magnifying the difference between inner and outer” and who, unlike scholastics, “want to *accentuate* the distinction between inner and outer, not conflate it.”⁶⁶ However, for many medieval scholars, and for Auriol especially, there is not the extramental physical world on the one hand and the mental realm of conscious subjects governed by different principles on the other. Rather, there is an environment exerting causal influences on the cognitive powers of living beings such that some potential features of the environment are actualized only dependently on the cognitive actions of these cognizers.⁶⁷ *Esse apparens* is, then, an apt expression of the mutual interdependence of world and cognizers, a property of the really existing things which, in turn, evince appearances only in so far as they are cognized.

The case of mirror images is perfectly illustrative here. A mirror image, as Auriol infers, is to be identified with the *esse apparens* of the appearing thing. The thing appears in the mirror with the phenomenal properties it can evince only once it has become the object of a visual experience. It is precisely the *esse apparens* due to which there is more to a mirror image than the mere reflections of lines of *species* of light and color propagating through the medium and

rebouncing from the mirror. Being the *esse apparens* of the thing reflected in the mirror, the mirror image is, on the one hand, external to the mind and localizable (usually) behind the mirror. Yet, on the other hand, the image is to some extent an outcome of the cognitive activity enabling the object seen to deploy its phenomenal properties. Being observer-dependent, the image is also reconstituted as the observer's position changes.

Note that Auriol's account is openly intended as a version of the unification account: what is seen in the mirror is the object itself, not an entity different from it. All the talk about its "apparent being" is meant as an expression of the dual dependence of mirror appearances on both the observer and the object. However, it is not ontologically committing: *esse apparens* does not have enough reality to be a full-fledged entity.⁶⁸ Therefore, Auriol's account provides an intuitive and elegant solution to the conundrum concerning the image movements. While Albert had to propose a complete *physical* recasting of all the *species* involved in mirror perception with each movement of the object, Auriol can solve the problem by saying that what is seen in the mirror is always the object. Since it is not a form in the mirror (and, thus, not a property of the mirror), its movements depend on the movements of the object and not on the mirror—they *are* the movements of the object itself in so far as appearing in the mirror.

A further merit of Auriol's account is that his explanation of mirror images is, unlike Albert's, coherent within his general theory of sensory perception, proving that there is an appearance of the thing involved in every perceptual act (albeit indistinguishable in veridical perception).

Nevertheless, Auriol's account cannot evade criticism. Earlier authors and especially Albert had emphasized the pivotal problem of every unification account. If we held that what is seen in the mirror is the real object itself and there is no real entity in the mirror, then every instance of mirror perception would be utterly deceptive. For "uneducated people who follow the judgment of sense rather than of reason," as Albert the Great states, speaking about an image in the mirror is an "irresistible error," since their "sight announces to them that there is an image in the mirror."⁶⁹ In other words, the unification account conflicts with common notions of mirror perception, which are saved only by accepting the multiplication account.

Was Auriol willing to admit that every mirror perception is illusory in a radical sense? He included the mirror example in his famous list of experiences which is often read as a list of visual illusions.⁷⁰ Further, in one place Auriol mentions that when a thing is seen by a direct line and *without any error*, its apparent and real being coincide, whereas when it is seen by a reflected or refracted line, the appearance "stands apart" from the actual place of the object seen, implying that the latter case is illusory.⁷¹ But the claim that mirror perception is illusory is rather counterintuitive as people use mirrors as useful instruments every day, providing further support for a multiplication theory.

Auriol seems to *both* hold that mirror perception is *not* illusory in a strict sense *and* preserve his unificationist account. The alleged delusiveness of mirror perception is relativized by advocating its practical usefulness. Take the example of seeing one's own face in the mirror. Even if the face appearing in the mirror were a real entity distinct from the real face (which is not the case, as the image exists in the mirror only apparently), or, in other words, if the multiplication account were right, it would *not* imply that the actual face would be seen to a lesser extent. For Auriol, this is justified by practical consequences: the observer would be able to act upon their own face by virtue of its mirror image: touch it, make it up, clean a stain on it, although their eyes would be primarily focused on the mirror image of the face. The possibility of discerning the face with all its features would be equally good as if the real face were behind the mirror.⁷²

Furthermore, the observer is not deceived if the unification account holds—they see the reflected thing itself. Hence, our practical ability to make use of mirrors reveals that mirror perception is not always deceptive. When the observer is speaking about what they see in the mirror, a considerable number of their statements are *true* propositions, since they are speaking about the real objects themselves. Whereas the information about the object's color, look, shape, parts, etc., available to the observer in mirror perception is roughly the same as in direct vision, only the information about the object's position and its right-left orientation presented to the senses seems distorted.

Hence, although Auriol admits mirror perception is not as accurate as normal veridical vision, it is not illusory in general.⁷³ In my opinion, Auriol would suggest that mirrors (at least, everyday plane mirrors) do not deliver perfect and completely veridical perceptual information to us; nevertheless, they do not force us to hold false beliefs. In other words, we get used to handling mirrors: we are aware of the mirror as such and prepared for the fact that some properties of the thing seen are not presented to us with complete accuracy. We are not fooled by mirrors when we are aware of them, and, as some contemporary philosophers say, we are usually not *epistemically innocent* in mirror perception.⁷⁴ Since mirrors intervene in the perceptual process only in a systematic and thus predictable way, we are entitled to say that they do not deceive us and that mirror perception is not illusory in the strict sense.

Auriol's other strategy against the alleged global delusiveness of mirror perception is the emphasis he puts on the claim that what is seen in the mirror (the mirror image or the thing in *esse apparens*) is the very real object itself. He is convinced that when we speak about what we see in the mirror, we are talking about the object itself and not about a kind of entity different from the object and somehow present in the mirror.⁷⁵

A fictional scenario by Auriol supports this unificationist intuition based on common descriptions of mirror images. Imagine there are two kinds of eyes. The first kind of eyes can gaze at nothing but mirror images conceived in a multiplicationist way, where the mirror image is different from the objects reflected but the observer cognizes the thing through its image (even, for that matter, equally well). The second kind of eyes always sees things in themselves, unmediated by any representation. Although both kinds of eyes may cognize the thing equally well, it would be counterintuitive, in Auriol's view, to say that the first kind has the things themselves as the object of vision.⁷⁶ If the multiplication account held, then observers would commonly talk primarily about the images and the things reflected only derivatively. Since it is more common to talk about the things themselves, mirror perception is more like normal direct perception than multiplicationist mediated perception in Auriol's view, unification accords better with our common intuitions and mirror perception (like the direct one) belongs to the second kind of eyes in Auriol's fictive scenario.

There is also a phenomenological justification for the claim that a mirror image is the thing itself. When sight is gazing at a mirror image, visual attention (*intuitus visionis*) is fixed upon it; it does not extend behind the image or bounce from it toward the thing.⁷⁷ Auriol is convinced that if mirror images were mere representations, seeing them would shift the direction of our attention somehow and would not leave us unaware of such a shifting.⁷⁸

However, Auriol's unificationist claim is also problematic for seemingly asserting that the real object and its image in the mirror are *identical*. But identity presupposes indistinguishability; which, apparently, is not the case: the positions of the real thing and its image are distinguishable and, thus, the two items are different. However, on a closer look, this objection is based on a misunderstanding of Auriol's theory. What it asserts is that a real object and its mirror image are *distinguishable* based on their different positions, but

distinguishing A from B presupposes (1) cognitively grasping A and B independently of each other and (2) comparing A and B with regard to a certain feature. However, in the case of mirror perception, the real object and its image are not grasped independently. To grasp the real object “as it is,” i.e. without its *esse apparens* (the mirror image), simply does not make good sense in Auriol’s theory since every cognitive grasping *necessarily* involves posing the thing grasped into *esse apparens*.⁷⁹ As (1) the real object and its appearance are not grasped separately, (2) the two cannot be compared in a single act of mirror perception.

In fact, the objection is *not* about comparing the real object and an apparent one in the *same* instance of perception but about comparing the objects (or, rather, the contents) of two different perceptual *acts*, namely, direct perception and mirror perception. Indeed, the object as appearing in direct perception and the object as appearing in mirror perception *are* distinguishable regarding their (apparent) positions. In the latter case, a mirror intervenes in the perceptual process and distorts the causal process of information transmission, the result being that the object appears to be somewhere other than it is. (Similarly, when we look at a thing with a magnifying glass, the image of the thing, or the thing as appearing due to the magnifier, is bigger than the same thing perceived directly.)

In other words, the two instances of *esse apparens* (albeit of the same object) are distinguishable (and thus different), which is not surprising since the causal processes generating them are different. Nevertheless, this does not imply at all that the *esse apparens* and its real object included *in a single act of vision* are distinguishable (and hence non-identical).

After all, this is the point Auriol himself stresses: when gazing at a mirror image, the observer encounters two items: the thing that appears and the appearance by means of which it appears. However, his perceptual content is not structured—the observer is not aware of what is from the thing and what is somehow added to the thing (and, definitely, something *is* added, allowing, for example, multiplied images in some kinds of mirrors, although the thing reflected remains single). On the contrary, the observer sees the whole thing and the whole appearance indistinguishably, as something simple.⁸⁰

The question remains: why does the mirror image appear to be located behind the mirror? Why does it not appear to be co-located with the real object? Auriol does not address the issue explicitly. However, he seems to imply that it is an outcome of the following two facts. First, mirrors are specific kind of media and are thus included in the process of cognitive information transmission, but they mediate information about a different part of the environment than the observer would expect. In other words, they change the direction of the propagation of *species* from the object to the observer’s eye.⁸¹ Second, it is a general phenomenological fact that everything seen is seen directly, as if located on a straight line directed from the eye.⁸² Auriol acknowledges the fact and even puts a special emphasis on it. Unlike Albert, he defines sensory powers not by their proper object but by their own “mode of appearing” (*modus apparendi*), i.e. the way the objects grasped by a certain power appear to it. The essential feature of the senses (and of sight in particular) is that objects appears to them as spatially localized by an imaginary straight line drawn from the eye.⁸³

With these two facts in mind, Auriol can explain mirror perception in the following way. When a *species* of the object reflected from the mirror enters the eye, it is processed by the observer’s visual power. However, as sight is unable to account for the mirror’s intervention in the propagation of *species*, it works as usual and generates the *esse apparens* (according to the information in the *species*) somewhere in the direction from which the *species* came. Hence, the object seen in the mirror seems to be on the prolongation of an imaginary straight line drawn from the eye outwards.

To sum up, Auriol is able to substantially weaken the objections against his unification account of mirror images: mirror perception is not universally illusory as the images seen in mirrors are the material objects themselves, with the further advantage over Albert's account that his explanation of mirror perception is compatible with his general theory of perception.

Conclusion

As a recent paper says, the worth of philosophical catoptrics (the philosophical study of special instances of perceptual experience involving mirrors) consists in that it “enables us to recast familiar issues in the philosophy of perception.”⁸⁴ The present chapter aimed to demonstrate that some issues included in this intellectual inquiry were anticipated by medieval philosophers. Neither of the two medieval stances on this issue introduced here went beyond the rudimental intuition that what is grasped by perception is an *object* and, consequently, what is seen in the mirror is also a kind of object. However, Albert the Great and Peter Auriol elaborated on this initial intuition in different ways. Albert stresses the (alleged) causal efficacy of the mirror image: it acts on the observer's eye; thus, it is a real entity. For Albert, these images are accidental forms, namely, qualities like colors, or rather *species* of colors existing in a special “spiritual” way, that enables them not to change the material structure of the mirror and make it colored. On the contrary, Auriol puts more stress on the observer dependency of these mirror images, a consequence being that what is seen in the mirror is the actual material object itself, albeit appearing behind the mirror. Explaining what it means “to appear,” Auriol postulates a special ontological layer of appearances that is dependent both on the real objects and on observers but not reducible to either of these.

Albert's multiplicationist attitude is more “metaphysical”: the appearance is reified and understood as a categorizable entity. The mirror image is something almost physical: it is an outcome of the physical process of light propagation and color abstraction in which the mirror has intervened. By contrast, Auriol embraces a more “phenomenological” attitude: as a unificationist, he cannot rely on a special entity in the mirror playing the role of the content of mirror perception. What is seen in the mirror is the object itself. However, as every object of perception, it is grasped only *in so far as it is appearing*—and, in this situation, the appearance of the object is behind the mirror.

Auriol is also more cautious than Albert in delineating between the physical description of the propagation of *species* and their reflection from the mirror on the one hand and the phenomenological description of the appearances seen in the mirror as partially resulting from the observer's own perceptual activity on the other. These two perspectives are confounded in Albert's theory: the mirror image is a *species* in the mirror playing the role of *both* the causal vehicle of mirror perception and its content. Consequently, a discrepancy sneaks into Albert's account of vision: *species*, usually casted as mere causal intermediaries in the visual process, suddenly become the true *object* of perception.

While Albert's explanation of mirror perception is weakened by being incoherent with his general visual theory, Auriol's theory perhaps pays too much for its compatibility with the rest of his theory of perception. It includes several perplexing claims, for example, “Auriol owes us an explanation for how” a cognitive act “can help us put the extramental object itself into a different type of being.”⁸⁵ Would he really subscribe to the idea that our cognitive activity somehow *completes* reality? Is it really plausible to read his theory of cognitive activity, which although performed within us has important results outside in the environment, as defying the boundary between mind and world, so self-evident for us? The medieval accounts of some perceptual ephemera place us before freshly conveyed but traditional philosophical questions.

Notes

- 1 On premodern catoptrics (mainly Euclid, Ptolemy, and Alhacen), see, e.g., Smith (2015: 55–72, 92–108, 195–206).
- 2 Pseudo-Ptolemy, *De speculis* 2, 153–154.
- 3 See, e.g., Simon (1987) or Smith (2004).
- 4 On these texts, see Smith (2015: 47–64, 76–129, 166–169, 181–227).
- 5 Physically speaking, there is no reversal in plane mirrors: every point of the object is directly opposite to its counterpart in the mirror image. However, from the psychological point of view, the mirror image is *perceived* as reverted since the right-hand person facing the mirror see the left-hand image. Such discrepancy, although often debated by contemporary scholars (see, e.g., Takano 1998 for a survey of possible explanations), was not problematized in medieval optics, and the latter, observer-involving attitude was preferred. See, e.g., Alhacen, *De aspectibus* VI.3, §3.7, 6, 163–164, 233.
- 6 See, e.g., Vendler (1991) who asserts that mirror images, albeit being outside us, are pure epiphenomena of the causal processes in our brains, projected outside us.
- 7 Such a setting of the problem is inspired by Casati (2012); the labels “multiplication” and “unification” account are borrowed from this paper. See also Steenhagen (2017).
- 8 It is worth noting that the motive for picking precisely these two thinkers is systematic, rather than historical: both present a philosophically interesting and relatively thought-out account of mirror images, regardless of whether it was historically influential or not. Also, there is no significant connection between these two thinkers, apart from the fact that Albert’s Aristotelian commentaries were commonly studied in the schools and Auriol could have become acquainted with them quite easily.
- 9 On Albert’s life and works see, e.g., Anzulewicz (1999: I, 4–17). Albert’s treatise, *De visu*, is in *De homine*, 145a–202b; the question on mirror images is on pp. 174a–179a.
- 10 The treatise is edited by H. Anzulewicz in Anzulewicz (1999: I, 179–200).
- 11 See, e.g., *Liber de sex principiis*, II.4, Borgnet I, 324b–326a; *De sensu et sensato*, I.8–10, 35a–45a; see also Albert, *De anima*, II.3.15, 121–122.
- 12 *De sensu et sensato*, I.6, 29b–30a; on the proponents of extramission, see I.5, 26b–28a.
- 13 *De sensu et sensato*, I.5, 28a–b.
- 14 *De sensu et sensato*, I.10, 43a–44b.
- 15 See Anzulewicz (1998: 262–265) or Lička (forthcoming).
- 16 Albert, *De forma resultante in speculo*, 183: “quicquid actu agit aliquid immutando, actu est; forma illa actu agit immutando visum; ergo actu est.”
- 17 Albert, *De forma resultante in speculo*, 191, 192.
- 18 Albert, *De forma resultante in speculo*, 184: “unumquodque est in illo ut in subiecto, a quo non distat per situm et locum; forma speculi non distat per situm et locum a speculo; ergo est in ipso ut in subiecto.” Note that the claim about the image existing in the mirror as in its subject or, in other words, as a form inhering in it has several problematic consequences (see below). Albert is aware of (and deals with) them already in *De forma resultante in speculo*. In later works, he abandons the claim itself: the image exists in the mirror not as in a subject but only as in a point of reflection (“[imago] est in ipso [speculo] secundum punctum in quo fit reflexio”; *Liber de sex principiis*, II.4, Borgnet, 325b) or as in an instrument “representing by means of reflection” (“sicut in representante per reflexionem”; *Liber de sex principiis*, II.4, Borgnet, 325b, 326a).
- 19 *De anima*, II.3.5, 103a.
- 20 Cf. *De anima* II.3.4, 101b: “omne apprehendere est accipere formam apprehensi.”
- 21 Al-Ghazali, *Physica*, IV.3.6, 65–66.
- 22 Variants of the second and third objection are mentioned by Albert in the context of ways a proponent of extramission may argue against an intromissionist theory of vision. See *De sensu et sensato*, I.6, 30a.
- 23 *De forma resultante in speculo*, 186.
- 24 Albert, *De generatione et corruptione*, II.1.1, Borgnet IV, 417b: “primae qualitates [...] causae sunt omnium aliarum sensibilibus qualitatibus [...] sunt quatuor qualitates primae, scilicet calidum, humidum, frigidum, et siccum.”
- 25 Pasnau (2011: 45–46).
- 26 Albert, *De homine*, 168b: “Color [...] secundum quod alterat corpora, videtur generari a primis qualitatibus.”
- 27 Albert, *De homine*, 183b: “[Color] non abstrahitur cum causis generantibus ipsum in subiecto, quae sunt calidum, frigidum, humidum, siccum [...] Sed abstractio fit in propria specie coloris tantum sine omni parte materiae et sine omni causa materiali; et hoc est, quod vocat Averroes [...] spirituale esse.”

- 28 *De forma resultante in speculo*, 193, 194.
- 29 Albert, *Liber de sex principiis*, II.4, Borgnet I, 324a–b; see also *De sensu et sensato*, I.10, 43a–b.
- 30 *De homine*, 173b; *De meteoris*, III.4.14, Borgnet IV, 682b–683b.
- 31 *De forma resultante in speculo*, 195–198.
- 32 *De sensu et sensato* I.10, 43b.
- 33 *De forma resultante in speculo*, 193: “[Forma in speculo] non proprie est longa vel lata, sed habet speciem longitudinis et latitudinis.”
- 34 *Liber de sex principiis*, II.4, Borgnet I, 325b: “Et quantitas imaginis quae apparet, quantitas est intentionalis et non quantitas distensa per mensuram.”
- 35 *De forma resultante in speculo*, 194–195; *Liber de sex principiis*, II.4, Borgnet I, 325b.
- 36 Cf. *De sensu et sensato*, I.6, 30a.
- 37 *De forma resultante in speculo*, 198–199. Albert was probably not acquainted with the ancient rule of localization of mirror images (the image appears to be in the intersection of an extension of the visual ray and a line drawn through the object perpendicularly to the surface of the mirror), on which see, e.g., Turbayne (1959).
- 38 The source of this *dubium* is most likely *Liber sex principiorum* (an anonymous twelfth-century treatise on the final six categories in Aristotle’s list). See pseudo-Gilbertus Porretanus, *Liber sex principiorum*, II.19, 39. Albert refers to this passage already in *De forma resultante in speculo*, 181–184, 193, and comments on the passage in *Liber de sex principiis*, II.4, Borgnet I, 324b–326a.
- 39 *De forma resultante in speculo*, 191–193; *Liber de sex principiis*, II.4, Borgnet I, 325b–326a.
- 40 *De homine*, 180b. Strictly speaking, the propagation of light is not locomotion (as light is not a body) but an instantaneous alteration of the diaphanous medium; see also *De anima*, II.3.13, 117b–118a.
- 41 See, e.g., Steneck (1980), esp. pp. 270–272; on the notion of the spiritual being see Dewan (1980).
- 42 *De homine*, 185a.
- 43 *De homine*, 304b–305a.
- 44 Admittedly, an acknowledgment of the contrast between the notions of *species* and image is present in an early theological work by Albert. Here he states that whereas the image (*idolum*) in the eyes (i.e. the *species*) is something “by means of which” (*per quod*) but not “in which” (*in quo*) we see the thing, the image (*idolum*) in the mirror is something “in which” (*in quo*) we see the thing. It may be inferred that, unlike the former, the latter case includes a primary grasping of the image itself. See Albert, *De resurrectione*, IV.1.9.3, 331a. However, from his *De homine* onwards, Albert apparently did not employ this neat contrast between *species* and image any more.
- 45 See Roger Bacon, *Perspectiva*, III.1.2, 258; or Pecham, *Perspectiva communis*, II.19: 168–170.
- 46 Auriol was definitely acquainted with perspectivist literature, as suggested already by Tachau (1988: 97–98).
- 47 An up-to-date summary of Auriol’s life and works is provided by Wöller (2015: 17–25).
- 48 See especially *Scriptum* I.1.6.4.102 (Auriol 1952–1956: I, 366–367); I.3.14.1.31 (II, 697), and *Scriptum* I.35.2.2, Auriol, 2014, II. 490–499. Cf. also Davenport (2006: 63–65) and Lička (2017: 116–118).
- 49 *Scriptum* I.3.14.1.31 (Auriol 1952–1956: II, 697); for the list see pp. 696–697 and, e.g., Tachau (1988: 90–93).
- 50 Auriol’s strategy is obviously inspired by the perspectivists—although Auriol mentions “*Perspectivus libro IV*,” referring to Alhacen (see Alhacen, *De aspectibus*, IV.4, 37–38), some of his arguments here are very similar to the ones proposed by Pecham in the passage referred to in note 45 above. (A possible influence of Pecham’s *Perspectiva communis* in this passage was suggested already by Wood 1982: 223.)
- 51 “esse reale et fixum extra in rerum natura absque omni apprehensione”, *Scriptum* I.23.2.50 (Auriol 2005: 711).
- 52 Such a semantic broadening of “real being” is to be dated into the early fourteenth century and relates to a shift in understanding intentional being: whereas older authors conceived *esse intentionale* as the mode of being of forms abstracted from matter, some later authors (chiefly those influenced by Scotus) understood it as the kind of being an object has in so far as it is cognized. Such a terminological move (and Auriol’s role in it) was uncovered already by Tachau (1999). However, her account evinces several minor deficiencies, e.g., her reading of Auriol’s notion of intentional being identifies dependency on the cognitive act with intramentality—a claim doubted already by Pasnau (1997: 72–73).
- 53 *Scriptum*, I.3.14.1.31 (Auriol 1952–1956: II, 697).
- 54 *Scriptum*, I.3.14.1.31 (Auriol 1952–1956: II, 697).
- 55 *Scriptum*, I.3.14.1.31 (Auriol 1952–1956: II, 697). Note that Auriol is not speaking about a mental content of mirror perception but only about the respective visual act—roughly, the physical realization of the visual experience which is, at least in principle, observable from the third-person perspective.
- 56 See the principle mentioned in note 37 above.

- 57 *Scriptum*, I.3.14.1.31 (Auriol 1952–1956: II, 697): “aliqui imaginantur quod imagines sint in speculo [...] sive videantur sive non videantur, hoc utique falsum est. Tunc enim sequeretur quod haberent verum esse reale.”
- 58 *Scriptum*, I.9.1.1, ES, ll. 312–315: “Et breviter, qui negat quin actus visionis possit ad apparentias terminari, cogitur confiteri quod omnia vera sunt quae videntur, contra quos disputat Philosophus, IV Metaphysicae, quia contradictoria essent vera, cum uni videatur sic, et alteri aliter.”
- 59 *Scriptum*, I.3.14.1.31 (Auriol 1952–1956: II, 697): “Relinquitur igitur quod sit sola apparentia rei vel res habens esse apparens et intentionale, ita ut ipsamet res sit infra speculum in esse viso iudicato et apparenti”; see also *Scriptum*, I.1.6.4.102 (I, 366).
- 60 For details of such a reading of Auriol’s cognitive theory, see Lička (2016: 56–69) (here also on Auriol’s identification of *species* with cognitive acts); Lička (2017: 111–115); see also Friedman (2015).
- 61 Recently, some interpretations were summarized and assessed by Pasnau (2017): 274–276.
- 62 See especially Tachau (1999: 349–350) for this line of reasoning.
- 63 *Scriptum*, I.23.2.55 (Auriol 2005: 712): “rerum apparitiones obiectivas [...] sunt realiter eedem cum hiis que existunt extra.”
- 64 *Scriptum*, I.27.2.2, ES, ll. 583–598.
- 65 *Scriptum*, I.3.14.1.31 (Auriol 1952–1956: II, 698): “non distinguitur imago seu res in esse apparenti ab esse reali, quia simul coincidunt in vera visione.”
- 66 Pasnau (2017: 277).
- 67 Take the example of universals or relations: Auriol, as a conceptualist, believes that only individual things exist really in the world; yet they have the potentiality to *appear as* universal or related to other things when appropriately grasped by an intellect. The intellect then has the power to actualize these potentialities and fulfil or complete the being of universals or relations. Scholastics owe this doctrine of the intellect as “completer” of reality to Averroes; see Kobusch (2009: 253–255).
- 68 Auriol points out that *esse apparens* is “nothing in itself” and must be reduced to something real, namely, the cognitive act. See *Scriptum*, I.9.1.1, ES, ll. 364–369; *Quodlibeta sexdecim* 8.1, fol. 81bC, and Friedman (2015: 144–145, 151). In *Scriptum*, I.9.1.1, ES, ll. 513–518, Auriol even says that *esse apparens* is merely metaphorical (*nihil est in se nisi deminute et metaphorice*).
- 69 Albert, *Liber de sex principiis*, II.4, Borgnet I, 325a: “Si autem dicatur in speculo non esse imago, quamvis hoc aliquo modo verum sit, tamen apud imperitum vulgus, quod iudicium sensus sequitur potius quam rationem, erit hic error intolerabilis, quia visus nuntiat imaginem esse in speculo.” See also *De sensu et sensato*, I.9, 39a–b and pseudo-Gilbertus Porretanus, *Liber de sex principiis*, II.19, 39 who speaks about an “incredible error.”
- 70 See, e.g., Wood (1982: 220–223).
- 71 *Quodlibeta sexdecim*, 8.3, fol. 87bE.
- 72 *Scriptum*, I.35.2.2, ES, ll. 492–499. In that place, Auriol makes a concession to the multiplicationist view *only* in order to illustrate the theological claim that God cognizes primarily his essence and, by means of that, secondarily but *equally perfectly* his creation. Emphasizing that in the case of God, cognizing *x* by means of grasping something different *realiter* does not mean that the former is cognized less perfectly, Auriol alludes to the case of mirror perception but reshapes it as if the mirror image were a real entity to make it analogous to the case of God.
- 73 *Scriptum*, I.9.1, ES, ll. 299–300. The argument that he includes mirror perception in his famous list is not decisive: the list is not intended primarily as a list of illusions but as a group of visual experiences revealing the active nature of the senses in perception.
- 74 Casati (2012: 197–200); Steenhagen (2017: 1229–1230, 1239–1241). Note that Auriol was prepared to account for our awareness of the mirror in mirror perception. He stresses that mirror perception is a more complex instance of cognition than a normal one, since there are *two* visual acts in our eyes simultaneously—both the *species* of the mirror and the *species* reflected by the mirror are received and processed at the same time. See *Scriptum*, I.35.2.1, ES, ll. 305–309; *Quodlibeta sexdecim*, 10.4, fol. 106bC.
- 75 It may be objected that Auriol uses the notion of mirror image too often, which opens the door for the multiplicationist view; however, he stresses that *imago* is a technical term borrowed from the perspectivist tradition that signifies nothing but the thing itself as appearing in the mirror—see *Scriptum*, I.27.2.3, ES, ll. 1100–1103.
- 76 *Scriptum*, I.35.2.4, ES, ll. 1167–1172: “Certum est enim quod, si poneretur duplex genus oculi—unum quidem quod non posset nisi imagines in speculo contueri, et per hoc omnia quorum essent illae imagines aequipollenter cognoscere diceretur [...]; alterum vero quod ipsas res aspiceret in se ipsis—si

- sic utique poneretur, nullus <diceret quod primus oculus, qui> [...] imagines cerneret, haberet pro obiecto res ipsas, sed potius aliquid aequipollens” (Emendation by editor).
- 77 *Scriptum*, I.1.6.4.102 (Auriol 1952–1956: I, 367): “Quod enim imago quae apparet in speculo sit res quae videtur, claret ex hoc quod intuitus visionis terminatur ad illam imaginem ultimate, nec reflectitur ab illa super rem.” See also *Scriptum*, I.35.2.2, ES, ll. 545–548.
- 78 Such a conception of mirrors as attention-switchers is elaborated by Auriol’s earlier confrère, Peter Olivi; see Lička (2017: 108–110).
- 79 See Tachau (1988: 94). After all, to cognize *x* is defined as posing *x* in *esse apparens* by Auriol; see Friedman (2015: 145–150); Lička (2016: 56, 61–62), and Pasnau (2017: 274).
- 80 *Scriptum*, I.1.6.4.102 (Auriol 1952–1956: I, 366–367): “In imagine [...] existente in speculo [...] in esse apparenti [...] et est res quae apparet et apparitio qua apparet, et tamen totum videtur apparitio et totum videtur res. Non enim intellectus distinguit imaginem in id quod est in ea de re, et in id quod est quasi additum illi rei, quia imago videtur sola res, et imago etiam videtur sola apparitio rei. [...] Quod autem imago illa includat aliquid ultra rem patet, quoniam imagines multiplicari possunt, eadem re inmultiplicata. Res igitur, ut apparens [...] videtur includere aliqua, puta rem et apparitionem, quae quidem videntur eadem per omnimodam indistinctionem [...] ut quid simplex.”
- 81 *Scriptum*, I.35.2.1, ES, ll. 336–337; *Quodlibeta sexdecim*, 10.4, fol. 106bC.
- 82 Such an a-priori feature of vision was emphasized already by ancient optics, see especially Simon (1987: 319–321) and Smith (2015: 92–93).
- 83 *Scriptum*, I.prooem.2.119 (Auriol 1952–1956: I, 208); *Scriptum*, I.35.1.1, ES, ll. 385–388; see also Lička (2016: 53–54).
- 84 Steenhagen (2017: 1242).
- 85 Friedman (2015: 164).

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8

PETER AURIOL AND ADAM WODEHAM ON PERCEPTION AND JUDGMENT

H. T. Adriaenssen

Although not as well known today as his younger contemporary William of Ockham, the Franciscan philosopher and theologian Peter Auriol (1280–1322) was one of the most original and influential thinkers of the early fourteenth century (see Friedman 2015). One area where Auriol's originality is particularly evident is his cognitive psychology, in particular his account of misrepresentation and sensory illusion. Indeed, where medieval thinkers traditionally develop their analysis of sensory cognition by starting from successful cases of veridical cognition, treating misperceptions as unfortunate exceptions to the rule, Auriol turns this procedure upside down (see Denery 2005: 118–119). For Auriol, it is precisely the cases where perception goes wrong that can teach us the most about the mechanisms of sensory cognition. In particular, Auriol believes that what these cases teach us is that the immediate objects of perception enjoy a mind-dependent kind of being, which he often described as “intentional,” or “apparent” being.

Auriol's claim that the direct objects of perception enjoy a mind-dependent kind of being elicited strong reactions from his contemporaries. In this chapter, I will concentrate on the critical response to Auriol in his fellow Franciscan, Adam Wodeham (1298–1358). For a long time, Wodeham has been known mostly as Ockham's personal secretary. Increasingly, however, he is being recognized as a highly skilled philosopher in his own right.¹ As we will see, Wodeham launched an interesting critique against Auriol's theory of the apparent being. The apparent being, he argued, would lead to skepticism, and was in fact unnecessary to account for the cases of perceptual error Auriol had discussed.

According to Wodeham, these cases can be accounted for without ontological heavy lifting once we realize that perception and judgment are structurally linked together. All by itself, this idea is not original in Wodeham and can be found in thinkers such as William of Ockham well.² Even so, Wodeham develops the idea in an interesting way and draws two general lessons from the interconnectedness of perception and judgment. The first is that the psychological mechanisms underlying what seem to be similar kinds of behavior in human beings and other animals are in fact importantly different in a number of ways. The second is that ordinary sense perception can give us but a qualified, or conditional, kind of certainty and knowledge about the world we live in.

The chapter proceeds as follows. The first section introduces Auriol's notion of apparent being and some of the most important objections that were raised against it by contemporaries such as Wodeham. The second section turns to Wodeham's alternative account of perceptual error. Finally, the third and fourth sections explore the two lessons Wodeham draws from the interconnectedness of perceptual acts and fallible judgment.

Auriol and the Apparent Being

Auriol introduces his notion of apparent being by considering the following illusion. Imagine you are traveling by boat and that you stand on the deck and look at the green trees on the shore. As the boat is carried further down the river, the trees that are now present in your visual field will slowly pass out of sight again, and this gradual passing in and out of sight of trees may create the impression that the trees on the shore are moving. A close analysis of this illusion, Auriol believes, will teach us some important facts about the basic mechanisms of perception.

Auriol starts his analysis with the assumption that all cognitions involve both an act and an object of cognition. The act, as it were, targets its object, and the object thereby becomes present to the act. In the case of the trees that appear to be moving, the act of cognition is an act of seeing, and what is present to this act is some kind of motion. And this raises a question. What is the ontological status of the motion that has become present to your act of seeing? After all, there is no real motion where you are looking. In the following passage, Auriol reviews some possible answers:

When someone is transported over water, the trees that exist on the shore appear to move. This movement, which is in the eye as an object, cannot be said to be the vision itself; otherwise a vision would be the object of sight, and a vision would be seen, and vision would be a reflexive power. But it cannot be said to really exist in the tree or in the shore either, because then they would really move. Neither can it be said to be in the air, because movement is not attributed to the air, but to the tree. Therefore it only exists intentionally, not really, in seen being and in adjudged being.³

(Scriptum, 3.14; Auriol 1952–1956: 696)

The first option Auriol sees is that the motion that is present to your act of vision somehow is an inner state of your visual system. But this cannot be the case. If it were, after all, what appeared to you in this situation would be an inner state of your visual system, not trees in motion.

The next option is that the motion that appears to you is somehow in the air. But that cannot be right either. For if it were, it would be the air that appeared to be in motion, not the trees. The remaining option is that the motion that has become present to your act of seeing is somehow a product of your own cognitive system. Indeed, according to Auriol, as a result of the motion of the boat and your position with regard to the trees on the shore, your cognitive system produces a kind of motion to serve as an object for your act of vision. To be sure, this is not a real motion, in the sense that no real thing is displaced as a result of what goes on in your mind. Rather, the motion that your cognitive system produces to serve as an object of your act of vision, is what Auriol calls an “intentional” motion, or a motion with “apparent” rather than real being.

Other perceptual illusions receive a similar treatment. For instance, when I see a stick that is partially merged into water, it will appear crooked to me. Again, Auriol infers that there must therefore be an instance of crookedness that is present to my act of seeing. But the being of this crookedness that appears cannot be reduced to that of any of the really existent

objects involved in this situation, such as the water, the stick, or my visual apparatus. Therefore, it must have a special kind of intentional or apparent being that is somehow a product of my cognitive system itself (*Scriptum*, 3.14; Auriol 1952–1956: 697).⁴ Again, when I hallucinate golden mountains, there is no real object to serve as the terminus of my act of cognition. Instead, the terminus of my act is supplied by my own visual system, which generates intentional or apparent mountains of gold to give content to my hallucination.

In these cases, Auriol thus assigns a special ontological status to that which appears to a subject. But, importantly, Auriol believes that illusions and veridical perceptions are cognitive acts of one and the same kind. And because illusions and veridical perceptions are acts of the same kind, they involve the same cognitive systems, and the entities that play a basic role in the analysis of illusion will have to feature in the analysis of veridical perception as well.⁵ In particular, Auriol reasons that when John appears to me in a veridical act of vision, John will have apparent being. Even in veridical vision, that is, “the exterior sense puts the thing in intentional being” (*Scriptum* 3.14; Auriol 1952–1956: 696).⁶ The difference with perceptual illusion is that when the trees appear to move the motion that is present to my act of seeing has apparent being only. When I see John, however, the same object has both a real being independently of me and an apparent being that is produced by my cognitive system. Seeing John thus involves the following entities:

- 1 my act of vision
- 2 John in real being
- 3 John in apparent being

Although a veridical vision of John thus involves both John in real being and John in apparent being, Auriol would not take this to mean that the act is directed at two distinct objects.⁷ For, according to Auriol, in a veridical perception of John, a relation of identity obtains between the second and third items in this list: it is John in both cases, just in a different kind of being. As Auriol himself puts it: “There is no distinction between an image or a thing in apparent being and a real being, because in veridical vision they coincide” (*Scriptum*, 3.14; Auriol 1952–1956: 698).⁸

Because what has real being and what has apparent being thus coincide in veridical perception, Auriol maintains, the fact that the exterior senses generate their objects in apparent being does not make perception indirect.⁹ The very external thing that appears to me begets apparent being by the act of the external senses. Ordinary sense perception does not involve the mediation of some kind of inner image that is different from the perceived object. Indeed, the introduction of such images in the analysis of sense perception, Auriol fears, would interpose a “veil” between the perceiver and the perceived object.¹⁰ It is precisely the interposition of such a veil that Auriol’s own theory seeks to steer clear of:¹¹

A thing that is seen when it really exists, also has adjudged and seen being. But this does not introduce any difference or distinction or plurality regarding that reality with respect to anything absolute, but it adds that intrinsic and indistinguishable relation that is called “objective appearance.” Therefore, sight does not terminate at the thing that is its object through the mediation of something absolute, as if there were some veil or medium between the vision and the wall that is seen.¹²

(*Scriptum*, 27.2; Auriol 2014: lines 598–599)

In spite of this and similar passages, however, many of Auriol's early readers feared that with his apparent being Auriol had introduced precisely the kind of interface between subject and object of perception he claims he has avoided. Thus, according to William of Ockham, it makes no sense to say that John in apparent being is identical with John. Hence, when John in apparent being is present to my act of seeing, what I have in front of me is something other than my friend, John. The reason that it makes no sense to say that John in apparent being is identical with John, according to Ockham, is that if a and b are identical, it is impossible for either one of them to exist or come into being without the other. But, on Auriol's own avowal, the apparent version of an object can exist even when that object does not enjoy real being. Indeed, this is precisely what happens when we remember, or imagine the presence of, things that no longer exist. Hence, no genuine identity can obtain between the two (*Ordinatio*, 1.27.3; *Opera Theologica* IV 239).

In a similar spirit, Ockham's contemporary, the Franciscan thinker Walter Chatton claimed that in Auriol's theory of cognition visual perception always involves an entity "in some kind of being distinct from the act of seeing and the seen object itself" (Chatton 1989: 87).¹³ This entity will function as "an intermediary between the cognition and the external thing" (*Reportatio et lectura*, prol. 2.2).¹⁴ And, as such, Chatton concluded, this intermediary will block rather than enable our cognitive access to the external world, and "impede the vision" of distal objects (*Reportatio et lectura*, prol. 2.2; Chatton 1989: 87).¹⁵

We find a similar line of criticism in Wodeham. Auriol's apparent being amounts to an interface between us and the external world, and it makes direct perception of objects impossible. To be sure, Wodeham knew well enough that Auriol's intention had never been to introduce a kind of interface between subject and object of perception. Indeed, he cites a passage where Auriol had claimed that for x to have apparent being just is for x to appear to some subject. On this view, to say that x has apparent being just is to identify a relation that holds between x and some subject of cognition, S . It is not to introduce a third thing that somehow mediates between x and S .¹⁶

But, according to Wodeham, this line of argument will not work. Relations, he points out, have what he called "foundations." The relation "appears to," for example, has two foundations, which occupy the empty spaces in the following expression:

1 ... appears to ...

Now, when x appears to S , one of the foundations of this relation is S :

2 ... appears to S .

But what is the other foundation? On Auriol's account, Wodeham reasons, it cannot be x itself. For if it were, the relation would not survive the disappearance of x . But it does. The very point of Auriol's decision to move illusions to the heart of his account of sense perception was that an object x can appear to a subject S even when x no longer exists.¹⁷

But if the empty space in (2) is not saturated by x , it must be some other entity, y , that serves this role. Hence we get:

3 y appears to S .

But that is to claim that y "mediates between a vision and whatever true external thing."¹⁸ We thus seem to have arrived at precisely the kind of indirect realism Auriol claimed he could steer clear of when he wrote that the apparent being is not some kind of veil between subject and object of perception.

Indeed, according to Wodeham, the only way in which Auriol can avoid this outcome is to say that x does not appear in virtue of an object y different from it, but rather in virtue of x in apparent being, as follows:

4 Apparent x appears to S .

But this, Wodeham argues, will not do either. After all, Auriol had wanted to say that for x to exist in apparent being just is for x to appear to S . Hence, to say that x appears to S in virtue of x in apparent being is to say that x appears to S in virtue of the fact that x appears to S . Or as Wodeham puts it: “But that mode of being of which you speak just is to appear objectively. Hence, the relation that is the appearance of the object would be a relation that founds itself” (*Lectura secunda*, prol. 4.5; Wodeham 1990: 92).¹⁹ Hence, it only remains that, as in (3), x appears in virtue of an object y different from x . What remains, then, Wodeham concludes, is that “there will as it were be an intermediary veil here” (*Lectura secunda*, prol. 4.5; Wodeham 1990: 92).²⁰

Of course, with the dismissal of Auriol’s theory of apparent being also came a challenge. For whatever its disadvantages, Auriol’s account did offer an analysis of perceptual error that may well have some intuitive appeal: when things are not as they seem to be, what is cognitively present to us is not real things themselves but something mind-dependent. As we will see in the next section, in order to account for sensory error without appealing to apparent beings or other special entities, Wodeham developed a theory of perception that assigns a crucial role to judgment and belief.²¹

Wodeham on Sensory Illusions

According to Wodeham, no special ontology of apparent being is needed in order to account for the cases of perceptual illusion cited by Auriol. When the trees on the shore appear to be in motion, for example, all that is present to my act of vision is motionless trees. That these motionless trees appear to be in motion can be explained as follows.

As you stand still on the deck and look at one of the trees on the shore, the angle between you and that tree will gradually change. In fact, it will change in just the way it would had you been moving away from the tree. Also, the distance between you and the tree varies in just the way it would had you step by step been moving away from it. Now, because you do not experience being in motion yourself—after all, you are standing still on the deck—you are led to ascribe these effects not to your own motion but rather to motion in the trees. In other words, you are led to judge that it is the trees, not you, that are in motion. As Wodeham puts it, the appearance of moving trees is not the vision of some kind of apparent motion but rather “an erroneous judgment that is caused as a result of the vision” of immobile trees from a moving vantage point.²²

Other sensory illusions receive a similar analysis. The stick appears to be broken, for instance, not because there is a broken stick in apparent being that is present to my act of seeing, but rather because optic conditions are such that my perception of a straight stick is followed by a judgment to the effect that the stick is bent. Indeed, Wodeham believes that perception and judgment go hand in hand in a structural way. Acts of perception are such that they incline us to form judgments about the existence and properties of their objects. When these judgments are true, our perception is veridical. When they are not, we fall prey to an illusion. In short, falling prey to an illusion is the result of a fault in judgment rather than perception.²³

At this point, the disagreement between Auriol and Wodeham to some degree resembles the disagreement, much later, in the twentieth century, between proponents of the sense-datum theory of perception and its critics. From the fact that a straight stick sometimes looks bent, proponents of the sense-datum theory inferred that what we see in this case is not the stick itself but rather a sense datum of a bent stick. From the further assumption that what is present to a perceiver in this sort of case has to be the same kind of thing that is present to a perceiver in standard cases of perception as well, they then concluded that in all perception that which is directly present to the perceiver is a sense datum that pertains to an external object rather than that external object itself.²⁴

Critics of this account, however, have argued that cases such as the illusion of the bent stick can be accounted for without recourse to theoretical entities such as sense data by recognizing the way in which our perceptual experiences are shaped by our beliefs. According to George Pitcher, for example, the illusion of the bent stick is a case where what we see just is a straight stick merged into water, but where we are led to form the belief that the object in front of us is bent. Now with the proponents of sense data, Pitcher agrees that cases of perceptual error can teach us something about perception more generally. But what they teach us is not that perception is mediated by some kind of special entity, but rather that “there is reason for thinking that perceiving and believing may be very intimately bound up with one another in all cases” (Pitcher 1971: 70).

Now, as Pitcher himself points out, this account faces a difficulty in cases where subjects cannot believe their eyes, so to speak. Suppose, for instance, that an experienced traveler in the desert comes to visually experience an oasis. As a result of their experience, they will not come to believe that there is an oasis in front of them. On the contrary, the belief they will come to entertain is the belief that there is no oasis in front of them, and that health and isolation are affecting their ability to correctly map the objects in their direct environment. According to Pitcher, however, this apparently damaging objection to his theory can be dealt with by assuming that the traveler acquires an inclination to form the perceptual belief that there is an oasis in front of them but that they somehow succeed in suppressing it. It is in virtue of the inclination they have that the oasis looks real to them. But it is because they can suppress this inclination that they do not believe their eyes (Pitcher 1971: 93).

The question here—how is it possible that things seem to be other than they are even when in fact we know better—is one that is raised by Wodeham as well.²⁵ To explain how it is possible that, for example, the trees on the shore appear to move even to someone who knows better, Wodeham refines his account of perceptual appearance. On his refined account, the appearance of motion is due, not to the judgment that the trees in motion, but rather to the mere formation of a mental sentence that says that they are. It is the mere entertainment of this sentence that leads to the appearance of moving trees, even though those who do not go on to assent to what it says will not be deceived by this appearance.

To be sure, the notion of an inclination to form a certain belief does not explicitly feature in Wodeham’s analysis of this kind of case. Even so, there is a clear parallel in Wodeham with the analysis Pitcher and others would offer some seven centuries later. Here is Wodeham:

This appearance is some kind of sentence, which has the vision of the tree as either subject or predicate. And thus it is a very evident apprehension, in that as a result of it, it will appear to man, whether he wills or not, that things are as this sentence says they are, even though he is not able to assent or dissent to this. All by itself, however, this sentence is such as to be apt to cause an assent that things are thus, even though this judgment is corrected by some other experience, or by a reason that things are not the way they appear to be.²⁶

(*Lectura secunda, prol, 4.8; Wodeham 1990: 100–101*)

The sentence we entertain in and of itself has an aptitude to trigger the judgment that things are in a certain way. Entertaining it thus makes us naturally inclined to assent to what it says. The evidence we have gathered on other occasions makes us able to resist this inclination and it is the combination of this natural inclination and our ability to resist it that accounts for the fact that the trees appear to us to be moving, even though we know better.

Human and Animal Perception and Behavior

Having built his account of cases like the stick that appears bent around the notion of judgment, Wodeham goes on to ask the following question: Do sticks look broken to dogs and other brute animals just as they do to human beings? At first, Wodeham grants, it would seem that they do (*Lectura secunda*, prol. 4.8; Wodeham 1990: 99). For when a dog tries to grab a stick that is merged into water and targets a portion of the stick that is beneath the water surface, it will often move its paw not to the actual location of the stick but to a place where the stick appears to be to a human perceiver. This suggests that the stick appears to be broken to the dog just as it does to humans.

However, Wodeham goes on, in order for a dog to have anything like the human appearance of a bent stick, it must be able to form a sentence saying that the stick is bent. Yet to say that brute animals like dogs have the ability to form sentences, according to Wodeham, is to turn them into rational animals. To say that they have the ability to form sentences, in other words, is to turn them into human beings.²⁷

One possible way out of this problem might be to say that dogs can in fact form sentences, even though they are not able to process these sentences to quite the same level we find in human beings. On this account, the stick looks bent to both men and dogs, and for the same reason: under certain conditions, both men and dogs are led to form a sentence that says that the stick is bent. But at the same time, this account maintains a clear distinction between the cognitive capabilities of dogs on the one hand and human rationality on the other.²⁸

This, however, is not the line Wodeham takes. According to Wodeham, when a dog looks at a stick that is half merged into water, it receives what he calls a simple vision of the stick. We are given no detailed account of what this simple vision is, but, arguably, Wodeham means that when the dog looks at the stick it receives some kind of nonconceptual representation or visual image of a brown object with a certain size and shape. If it had the power of judgment, the reception of this simple vision would lead the dog to judge that the object of vision is brown, that it is long, or that it is bent. But, according to Wodeham, brute animals like dogs lack the ability to form sentences and to judge of their truth. Their experience of sticks that are merged into water thus stops at the level of simple vision: “I concede that brute animals have simple visions, which if they were capable of such a complex of propositional apprehension, would normally be followed by a judgment” (*Lectura secunda*, prol. 4.8; Wodeham 1990: 99).²⁹

Because dogs lack the ability to form sentences such as “the stick is bent,” Wodeham concludes, it is wrong to say that the stick appears bent to them.³⁰ Even though, as we shall see, humans too are capable of something like the dog’s simple vision, Auriol’s position is that the cognitive state we are in when a stick looks bent to us is something distinctively human that we do not share with other animals.

One implication of this is that there is no unified explanation for what would seem to be very similar behavior in human beings and other animals. To see this, consider the case of a dog that grabs at a stick that is partially merged into water and moves its paw in the direction of place where stick would have been had it been bent. What happens here is that, in a first stage, the dog’s eyes receive certain stimuli that provide it with a kind of visual image of a distal object. Now according to Wodeham, the dog is hardwired in such a way that visual

images of a certain kind always lead to behavior of a certain kind.³¹ In this case, the visual image of a bent object leads the dog to move its paw to a place where the stick would have been had it in fact been bent (see Fig. 8.1 for a schematic of this process).

Now consider what at first looks to be a similar kind of behavior in a human animal. Suppose a child sees a pencil that is half merged in a glass of water and imagine that one of their parents asks the child to touch a submerged part of the pencil. The child then moves their fingers to a place beneath the water surface where the pencil would have been had it been bent. To their surprise, they find that all their fingers touch is water, not the pencil.

According to Wodeham, what happens here is that, in a first stage, the child of course receives visual stimuli from the object in front of them, which lead to a simple vision of that object. But already at this level we find a difference with the case of the dog. For in the case of the dog, simple vision is an act of its sensory soul: the principle that makes the dog a living and sentient organism. Not so in the case of the child. For according to Wodeham, the soul of a human being is an intellectual soul. It is the principle that makes a human being a living organism capable of thought. And it is in this soul that all human acts of cognition are realized, acts of perception included (*Lectura secunda*, prol. 1.5; Wodeham 1990: 15).³²

How does this make the simple vision in the child different from the simple vision of the dog? As we have seen, the simple vision of a stick in the dog arguably provides it with the image or impression of a brown object of certain color and shape. There is no reason to believe, however, that this allows the dog to see the object as an object of a certain kind, or as a stick. For to see the object as a stick the dog would have to be able to deploy the concept of being a stick, for which it lacks the cognitive abilities. Children, however, do have the ability to master and use concepts, and according to Dominik Perler (2008: 164), when Wodeham says that all human acts of perception take place in the intellectual soul, part of what he means is that the content of human acts of perception is always to some degree conceptual. To see an object, for a human being, always is to see it as an object of a certain kind. Hence, if the child in our example has mastered the concept of being a pencil, they will see the object in front of them as a pencil rather than simply receive the image of a long object with a certain color and shape.³³

As a result, the object of simple vision in the case of the child will immediately be available for the formation of sentences about pencils. Part of what this means is that they will be able to connect their understanding of the pencil in front of them with other concepts and proceed to form such sentences as “this pencil is bent.” This will cause the pencil to appear as bent to the child. If the child then proceeds to judge that the pencil is in fact bent, we say that they err, and this error explains why their hand misses the pencil (see Fig. 8.2 for a schematic of this process).



Figure 8.1



Figure 8.2

Thus, the explanation of what looks like similar behavior in the dog and the child in fact differs between both cases in a number of ways. First, the child behaves the way it does because it sees the stick. And so does the dog. But the child sees the stick in a way that the dog does not. It sees the stick as a stick, which makes the stick directly available for the subject or predicate position of mental sentences. Human seeing thus differs from canine seeing.³⁴

Second, the child behaves the way it does because the pencil appears to be bent. The dog behaves the way it does because there is a hardwired connection between a certain kind of visual input and a certain kind of action. Third, the child behaves the way it does because its judgment errs. But the same cannot be said of the dog. To err for the child is to go wrong on the level of judgment. But dogs do not judge. Hence they do not err. Wodeham himself does not make this point explicit, but in his sympathetic summary of Wodeham's views, his contemporary, the Parisian scholar Jean of Mirecourt, was happy to put the point as follows:

The fourth conclusion is this: Through no sensation do [brute animals] form compositions or judgments, because then they would entertain sentences and the like, as is clear. The fifth conclusion is this: No brute animal is ever deceived. This is sufficiently clear from the foregoing conclusion. For every deception is an erroneous judgment, but brute animals have no such judgment.³⁵

(John of Mirecourt 1958: 433)

To err, according to Wodeham and Mirecourt, is human indeed.

Perception and Knowledge

His engagement with Auriol led Wodeham to reconsider the mechanisms of misperception and the relation between perception and judgment. But Auriol's stress on illusion and perceptual error also provided fuel for discussions about the reliability of sense perception.

Starting with the Franciscan thinker Duns Scotus, many scholastic thinkers in the late thirteenth and early fourteenth centuries referred to sense perception as "intuitive cognition." Although there was disagreement about the precise definition of intuitive cognition, many thinkers held that intuition was the cognitive modality that provided us with access to contingent facts about the present and thus served as our primary source of certainty about the world we live in.³⁶ But with Auriol's decision to place illusion and perceptual error at the center of his theory of cognition, the question of just how much certainty intuitive cognition can actually provide us with gained salience. Wodeham was one of the thinkers to offer a detailed discussion of this question.

According to Wodeham, for an intuition to give us certainty about the contingent present is for that intuition to yield a judgment about the contingent present that is certain. Now for a judgment to be certain it must first be true. The notion of a judgment that is both certain and false "includes a repugnancy" (*includit repugnantiam*) (*Lectura secunda*, prol. 2.3; Wodeham 1990: 37). But if truth is necessary for certainty, it is not sufficient. For if I correctly judge that John exists without seeing him, Wodeham would say that my judgment, though true, fails to be certain. As he also puts it, my judgment that John exists in this case will amount to "estimation" (*aestimatio*), rather than certainty. But just what does Wodeham think is needed for certainty in addition to truth? This is a question that he himself does not explicitly address in any detail. What he does tell us, however, is that his distinction between certainty and estimation has its roots in "the Commentator and the Philosopher" (*Lectura secunda*, prol. 1.5; Wodeham 1990: 14).

More precisely, Wodeham's distinction between estimation and certainty traces back to Averroes' commentary on Book VII of Aristotle's *Metaphysics*. According to Aristotle, opinion deals with "what is capable of being otherwise," but knowledge is about what cannot be otherwise (*Metaphysics*, 1040a1). Knowledge, in other words, is about what is necessary, and what falls short of necessity is in the domain of opinion. Or as Averroes put it, "It is impossible for knowing and not knowing to be of that which is not necessary. Of such things, there is only estimation" (*In Metaphysicam*, VII.17; Averroes 1552: 95).³⁷ When Wodeham traces back his distinction between opinion and certainty to Aristotle and his Commentator, then, the suggestion is that certain judgments, for him, are true judgments that necessarily obtain.

At first this makes it hard to see how intuition could possibly yield certainty. The very point of intuition, after all, is that it gives us access to contingent matters of fact about the here and now, so if certainty is defined in terms of necessity, there seems to be no way in which intuition could ever yield more than estimation. But, at the same time, Wodeham makes it clear that intuition yields at least some kind of certainty, writing that intuition is that mode of cognition "in virtue of which the soul with certainty naturally assents that such a thing exists unless a miracle or some other impediment should stand in the way" (*Lectura secunda*, prol. 3.1; Wodeham 1990: 65).³⁸

Wodeham's position seems to be as follows. Suppose you are seeing a man and judge that he is tall. Also suppose that God does not intervene in nature to deceive you and that there are no natural factors such as poor optic conditions or health problems that would incline you to error. In this scenario, Wodeham would say, you judge with certainty that the man is tall. To be sure, it is not a necessary truth that the man is tall. But given that nothing in this situation stands in the way of a correct judgment, you will never judge falsely. In claiming that intuitive cognition gives certainty then, it seems that what Wodeham is saying is not that:

if p is an intuition-based judgment unaffected by divine deception or natural impediments, p is necessarily true,

but rather that:

necessarily, if p is an intuition-based judgment unaffected by divine deception or natural impediments, p is true.³⁹

In this way, intuition-based judgments can at the same be certain and pertain to contingent matters of fact.

The certainty that intuition can give us for Wodeham is thus a conditional kind of certainty. Intuition gives certainty, as long as certain conditions are met. Now, Wodeham recognizes that it will often be very hard for us to tell, in a given situation, whether or not these conditions are in fact met. We may not be able to identify all of the natural defeaters for our perceptual beliefs, and there seems to be no way of ruling divine deception in any given case. This sensitivity to the possibility of undetected error becomes particularly clear in Wodeham's discussion of the kind of knowledge that intuition can give us.

A judgment counts as knowledge, Wodeham explains, when it is evident (*Lectura secunda*, 1.1 and 1.2; Wodeham 1990: 206 and 219). Now, part of what it means to say that a judgment is evident, we are told, is that it is certain. But, although some of his modern commentators have treated "evident" and "certain" as synonyms in Wodeham, he himself

explains that for a judgment to be evident, it is necessary but not sufficient that it be certain: “every evident judgment is certain, though the converse does not hold.”⁴⁰

Evident judgments, indeed, are those certain judgments that are also indubitable, allowing of no doubt whatsoever (*Lectura secunda*, prol. 6.18; Wodeham 1990: 163–164). Clearly, this means that very few judgments can, properly speaking, be deemed evident. More to the point, judgments concerning contingent external states of affairs cannot properly speaking be evident. My perception of John, after all, may be impeded by an indisposition of my eyes, by poor visual circumstances such as mist or darkness, or just by the too great distance between John and myself. These factors can hinder the formation of a correct judgment, and I may not always be able to rule out that I have fallen prey to some kind of perceptual illusion or error. Moreover, even under the best possible natural conditions, there always remains a possibility that God should deceive me.⁴¹ Some doubt remains possible, and it can never be fully evident to me that John is pale. Wodeham is aware of this, and writes:

I concede what is inferred about a judgment that regards a contingent truth about an external thing. For no such judgment is simply evident with an evidentness that excludes all possible doubt. Because if all possible cognitions and judgments would be caused by either God or nature, it would be possible that in virtue of God’s absolute power, things are not such as they would be signified to be by such an apprehended cognition. And I concede that every created intellect is of such a low nature that it can be deceived concerning any contingent truth about an external thing if it categorically assents to it being or not being.⁴²

(*Lectura secunda*, prol. 6.16; Wodeham 1990: 169)

In light of this, Wodeham concludes that it can never be categorically evident to us that a given external object exists or that it has certain properties. The most we can evidently judge on the basis of an intuition, he thinks, is that: “Socrates is, or Socrates is white, and things like that, except when God miraculously intervenes here, or when there is an impediment due to the imperfection of that cognition, or due to some indisposition on behalf of the object, the medium, the power or the organ” (*Lectura secunda*, prol. 2.2; Wodeham 1990: 35).⁴³

As he puts it later on, intuitive cognitions allow for evident hypothetical judgments but not for evident categorical ones: “Though no categorical evident judgment that the moon is eclipsed may be had, yet a hypothetical evident judgment is had” (*Lectura secunda*, 1.2; Wodeham 1990: 222).⁴⁴

Wodeham thus recognizes that perception may lead us to judge falsely in ways that we cannot fully rule out. This does not, however, make him a skeptic. On the contrary, Wodeham believes that conditional certainty and hypothetical *evidentia* suffice, even for scientific knowledge. Consider, for instance, an astronomer who witnesses a lunar eclipse and wants to draw the general conclusion that the moon is the kind of celestial body that can be eclipsed. Now, according to Wodeham, the astronomer will not be able to rule out all possibility of error, and the knowledge he obtains from his observation will be of the conditional, or hypothetical, kind. But this, Wodeham concludes, is all the astronomer needs. The hypothetical knowledge that the moon is eclipsed provided that the right epistemic conditions are met suffices for the astronomer to conclude that the moon is an eclipsable body (*Lectura secunda*, 1.2; Wodeham 1990: 220).

Conclusion

Auriol stands out in the context of medieval cognitive psychology by moving the phenomenon of perceptual error from the periphery to the heart of his theory of cognition. Illusions can teach us a lot about the mechanisms and ontology of sensory perception, Auriol believed. Even though many thinkers objected to the lessons Auriol drew, he did effectively move perceptual error to the center of a number of discussions. We clearly see this in the work of Adam Wodeham. In response to Auriol, Wodeham develops an account of perception on which perceiving and judging go hand in hand. This explains cases of perceptual error but also implies that animal behavior and perception cannot be accounted for the way human behavior and perception is. The state we are in when, for instance, a stick appears bent, presupposes a cognitive apparatus that is distinctively human, Wodeham believes. To explain the behavior of animals in terms of how things appear to them, as a result, is problematic.

A final lesson that Wodeham drew from the interconnectedness of perception with our fallible power of judgment, was that intuitive cognition provides us with but a conditional certainty about the world. But even though this qualifies the kind of knowledge intuition can give us, according to Wodeham, conditional knowledge was knowledge enough for science.

Notes

- 1 On Wodeham's life and work, see Courteney 1978.
- 2 See, for example, *Ordinatio* 1.27.3 (*Opera Theologica*, IV 243–250).
- 3 “[C]um quis portatur in aqua, arbores existentes in ripa moveri videntur. Iste igitur motus, qui est in oculo obiective, non potest poni quod sit ipsa visio; alioquin visio esset obiectum visus, et visus videretur, et esset visus potentia reflexiva. Nec potest poni quod sit realiter in arbore vel in ripa, quia tunc realiter moverentur. Nec potest poni quod sit in aere quia aeri non attribuitur, sed arbori. Est igitur tantum intentionaliter, non realiter, in esse viso et in esse iudicato.”
- 4 “Actus sensus exterioris ponit rem in esse apparenti.”
- 5 Auriol would thus reject disjunctivist accounts of perception, which deny that illusions and veridical perceptions are the same kind of cognitive act.
- 6 “Actus sensus exterioris ponit rem in esse apparenti.”
- 7 Thus, I don't think Auriol would say that in veridical perception, we see apparent John *and* real John.
- 8 “[N]on distinguitur imago seu res in esse apparenti ab esse reali, quia simul coincidunt in vera visione.”
- 9 Cf. Denery (2005: 130–131); and Perler (2006: 279).
- 10 Worries about a “veil of perception” are often associated with early-modern theories of perception according to which mental representations or “ideas” are the immediate objects of perception. As I argue in Adriaenssen (2017a), however, the worry that representational devices will veil external objects rather than provide us with access to them was hotly debated as early as in the thirteenth and fourteenth centuries. See also Pasnau (1997: chapter 7) and Perler (2006: 49).
- 11 On Auriol's criticism of indirect realism, see Adriaenssen (2017a: chapter 3).
- 12 “[R]es quae videtur, cum hoc quod realiter existit, habet etiam esse iudicatum et visum, quod quidem non ponit varietatem aliquam aut distinctionem, vel numerum cum realitate illa quantum ad aliquid absolutum, sed addit respectum illum intrinsecum et indistinguibilem, qui dicitur ‘apparitio obiectiva’. Non igitur terminatur visus ad rem obiectam mediante aliquo absoluto, quasi sit aliquod pallium vel medium inter visionem et parietem qui videtur.”
- 13 “[P]onatur res in quodam esse distincto ab actu videndi et ipsa re visa.”
- 14 “[M]ulti alii ponunt unum esse obiectivum huiusmodi, medium inter cognitionem et res extra, deminutum quoddam. Etiam quidam hoc ponunt in cognitione intuitiva, ut tactum fuit in Prologo. *Reportatio* 1.3.2.1 (Chatton 2002: 233).
- 15 “[I]mpediet visionem albedinis.”
- 16 He quotes Auriol's claims to the effect that an apparent being “non claudit in se aliquid absolutum nisi ipsam realitatem” [sc. the reality that appears], and that it “claudit tamen aliquid respectivum, videlicet apparere, quod non debet intelligi ut affixum aut superpositum illi rei.” *Lectura secunda*, prol. 4.4 (Wodeham 1990: 90–91). See Auriol, *Scriptum*, 27.2 (Auriol 2014: l. 586). See also Grassi (2005: 132).

- 17 “[Q]uaeso: In quo fundatur? Aut immediate in ipsa realitate vera, et tunc non posset manere realitate illa adnihilata per potentiam Dei, cum respectus non possit esse modo sibi competenti sine fundamento existente, cuius oppositum tu dicis, ponens apparitionem obiectivam etiam naturaliter ubi res visa nihil est.” *Lectura secunda*, prol. 4.4 (Wodeham 1990: 91).
- 18 “[I]gitur realitas absoluta mediat inter visionem et quamcumque rem veram extra.” *Lectura secunda*, prol. 4.5 (Wodeham 1990: 92).
- 19 “Contra: ille modus essendi, de quo est sermo, non est nisi apparere obiective. Igitur respectus ille qui est apparitio obiecti esset respectus fundandi se ipsam etc.”
- 20 “Et ita erit ibi quasi pallium medium.”
- 21 Similar accounts can also be found in William of Ockham and Chatton. See Wood (1982).
- 22 “Sed illa apparitio non est visio sed iudicium erroneum causatum mediante visione.” *Lectura secunda*, prol. 4.7 (Wodeham 1990: 97).
- 23 See *Lectura secunda*, prol. 2.2 and 3.1 (Wodeham 1990: 35 and 65). For discussion, see also Wood (2002: 78).
- 24 See, for example, Ayer (1963: 3–11).
- 25 See also, briefly, Ockham, *Ordinatio*, 1.27.3 (*Opera Theologica*, IV.246).
- 26 “Sed est ista apprehensio quaedam complexa, habens pro subiecto vel praedicato vel utroque visionem ipsam arboris ... Ideo est multum evidens apprehension, in tantum quod ipsa posita appareat homini, velit nolit, sicut ipsa esse significat, licet non competat eum assentire aut dissentire. Licet ipsa quantum est ex parte illius nata sit causare assensum quod sic sit, tamen per aliud rectificatur, puta per experientiam aliunde vel aliunde, vel ratione quod non sit ita sicut apparet esse.”
- 27 *Lectura secunda*, prol. 4.8 (Wodeham 1990: 99). This problem is briefly hinted at in Ockham’s *Ordinatio*, 1.27.3 (*Opera Theologica*, IV.246). As Maria Elena Reina has pointed out, however, Ockham shows no genuine interest in the matter. See Reina (1986: 602).
- 28 This seems to have been the account on offer in Wodeham’s near contemporary, Gregory of Rimini. On Rimini on animal cognition, see Reina (1986), and Perler (2012: 45–49).
- 29 “Concedo quod in brutis sunt visiones tales simplices, ad quas natum esset sequi iudicium ... si talis apparitio collativa seu composita ipsis competeret.”
- 30 “Assumptum est negandum.” *Lectura secunda*, prol. 4.8 (Wodeham 1990: 99).
- 31 Wodeham compares this to the way in which, in human beings, the feeling of an itch directly leads to scratching behaviour without the mediation of any further cognitive act. *Lectura secunda*, prol. 4.8 (Wodeham 1990: 100).
- 32 “Omnis sensatio nostra recipitur immediate in intellectu et est actus sensitivus.”
- 33 One may wonder how this works for the perceptual acts of prelinguistic toddlers. Indeed, it is not clear that their acts of perception are informed by concepts in quite the way ours are. Still, it seems Wodeham can insist that the perceptual acts of even very young children are different from the simple perceptions of animals in an important way. Being realized in the intellectual soul, all human acts of perception have at least a basic potential for conceptual information that is lacking from the cognitive states of animals.
- 34 Jack Zupko (2008) discusses a similar “heterogeneity thesis” in John Buridan.
- 35 “Quarta est ista, quod nulla sensatione formantur complexa vel iudicia, quia tunc haberentur propositiones et similes, ut videtur. Quinta est ista: nulla bruta decipiuntur; ista statim patet ex praecedenti, quia quaelibet deception est iudicium erroneum, bruta vero non habent iudicium.”
- 36 See, for example, Scotus, *Ordinatio*, 1.3.14 (*Opera*, III.146).
- 37 “[E]st impossibile scire aut ignorare illud, quod potest non esse tale, sed est secundum existimationem.”
- 38 “Anima naturaliter assentiret certitudinaliter quod tale existeret nisi obstaret miraculum vel aliud impedimentum.”
- 39 Presumably, “necessarily” in this context means something like “it is always the case that.” But nothing in my argument hinges on Wodeham’s interpretation of modalities.
- 40 For example, Wood (2002: 78); “Omne iudicium evidens est certum, licet non econtra.” *Lectura secunda*, prol. 6 (Wodeham 1990: 173).
- 41 On this scenario in Wodeham, see also Karger (2004).
- 42 “Concedo illud quod infertur de iudicio correspondenti veritati contingenti, significanti rem extra. Nullum enim tale iudicium est simpliciter evidens evidenter excludente omnem dubitationem possibilem. Quia cum hoc quod Deus vel natura causaret in mente omnem notitiam et iudicium possibile, staret quod de potentia Dei absoluta non sic esset in re sicut per talem notitiam apprehensam significaretur. Et concedo quod omnis intellectus creabilis est ita diminutae naturae quod decipi potest circa quamcumque veritatem contingentem de re extra si sic assentiat categorice esse vel non esse.”

- 43 An intuitive cognition is described by Wodeham as a cognition “virtute cuius potest cognoscere evidenter quod Sortes est vel quod Sortes est albus et huiusmodi—nisi Deus miraculose operatur hic, vel nisi sit impedimentum propter imperfectionem illius notitiae vel propter aliquam indispositionem ex parte obiecti vel medii vel potentiae vel organi.”
- 44 “Licet non habeatur iudicium evidens categoricum quod luna eclipsatur, habetur tamen evidens iudicium hypotheticum.”

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PART IV

Problems of perception in early modern philosophy

INTRODUCTION TO PART IV

Brian Glenney and José Filipe Silva

If the picture of a young beautiful lady should be drawn according to the representation of the microscope, or according to the various refraction and reflexion of light through such like glass; it would be so far from being like her, as it would not be like a human face, but rather a monster, than a picture of nature.

(Cavendish 2001: 51)

The rise of natural philosophy offered philosophers in the early modern period both novel technological instruments and explanatory mechanistic methodologies, shaping the story of the early modern period as both blessed and cursed by these gifts. With these new instruments came new ways of experiencing the world, both microscopic and galactic, and thereby new sources of knowledge. But to turn these instruments back on the medium-sized objects of everyday perception and traditional ways of knowing, as Cavendish notes above, generates a sometimes-monstrous reflection. Even the mechanistic methods skew interpretations of reality toward the simplistic, including the theorization of perception being a pinball-like process, as Hobbes writes in *Leviathan*:

The cause of Sense, is the Externall Body, or Object, which presseth the organ proper to each Sense, either immediatly, as in the Tast and Touch; or mediately, as in Seeing, Hearing, and Smelling: which pressure, by the mediation of Nerves, and other strings, and membranes of the body, continued inwards to the Brain, and Heart, causeth there a resistance, or counter-pressure, or endeavour of the heart, to deliver it self: which endeavour because Outward, seemeth to be some matter without.

(Hobbes 1994: 6)

Is the mind a set of passive gears put into motion by external pressures? Or is there active will involved, as Hobbes attempts to later include, and if so, where and how might it be reconciled into the mental machinery?

The active will vs. passive perception debate, discussed below, however, is often overshadowed by the epistemological query as to where our ideas of the world originate: innate or learned and if learned are they acquired by experience or by reason? And if reason is the

primary means of knowledge acquisition, are its rudiments available at birth or must they at least be activated by experience? This narrative is largely Kant's retelling, as he tasks himself with reconciling the empiricist and rationalist starting points. Similarly, Reid has a related yet distinct story that conveys both parties into a pit of skepticism that his commonsense method for direct realism sought to resolve. These familiar stories, however, are only chosen narratives that we can just as well reject for still others.

An often untold narrative of early modernity plots active vs. passive processes of perception and how these do or do not result in knowledge of the external world, a narrative that begins with the often overlooked African philosopher, Anton Wilhelm Amo. Amo offers one of the sharpest pictures of the role of mechanism of perception. Rather than offering a confused and ultimately conflicted hybrid account of mind and body as his predecessors Hobbes, Descartes, and Leibniz, Amo claims that perception is "impassive" and solely of the body, the senses functioning not unlike the heart and lungs. The mind does not sense at all but is rather actively and spontaneously engaged in various intentions and willings, using the body as its instrument. Amo's dualism simply avoids an account for how mechanism and mind meet, an account as clear as it is minimalist. He simply affirms that the mind can act spontaneously and the body follows mechanistically. As Chris Meyns discusses in their chapter, "Amo had said of the human mind that it understands and uses sensations appearing in the body ... Crucially, this requires no extrinsic properties to transfer into, or be contained in, spirit" (p. 175–6). How? Meyns continues, "When I use my phone to communicate or determine my location, I nonetheless remain distinct from it. Similarly, a mind that uses a body as an instrument that still remains distinct from it" (p. 176). Amo's account, while austere, provides a point of clarity in an otherwise confounded space of problems. In particular, Amo sets up a rather fundamental problem in perception: whether and to what extent the mind might be involved in manipulating the otherwise passive sensations from the body, a point to which all the early moderns responded but which is rarely discussed in such a context.

Consider Molyneux's question, whether a newly sighted person could immediately identify shapes previously known by touch alone, as an initial point of departure for considering Amo's point of the senses being separate but manipulated by mind. In her chapter, Janet Levin describes how this was interpreted by early moderns, as follows:

Most of Locke's contemporaries, e.g., Berkeley, Diderot, Leibniz, and Molyneux himself, take the question to be whether there are common "ideas" of spatial figures afforded by sight and touch, or rather two distinct, modality-specific, sets of ideas which we (quickly and almost unconsciously) learn to associate in our normal visual and tactual experience of the world.

(p. 185)

Her inclusion of "quickly" and "unconsciously" suggests that Molyneux's question itself could be used a barometer for Amo's impassivity claim. In other words, if the newly sighted could not immediately identify the shapes, then an identification would not be registered as sensory. How one answers Molyneux's question, it seems, provides a basis for whether one views the senses as part of an active mind or passive body.

Locke infamously claims that untrained vision, what in this case might be considered a passive body, is restricted to 2D shapes, a "flat Circle variously shadow'd" leading interpreters, including Levin, to assume that for Locke the newly sighted can quickly and unconsciously identify 2D shapes. But what of 3D shapes? Levin's paper is remarkable in that it contests the claim made by virtually all commenters that for Locke active judgment by the

mind, informed by experience and time, is required to perceive in 3D. For one, she argues that for Locke the 3D shape presented to the newly sighted could not be the object of perception, but rather, “it’s the ‘flat and shadowed’ idea *itself* that gets altered” (p. 188). Levin continues, “In addition, this interpretation seems to conflict with Locke’s claim, in other sections, that both vision and touch (directly) produce (simple) ideas of ‘figure’” (p. 188). It seems, Levin claims, that on Locke’s own account the newly sighted *could* register a functionally equivalent globe idea at first sight given that Locke allows for *implicit* judgment by the senses, a hybrid of the intellect that suits Amo’s impassivity claim. More importantly, we see that an implicit connection between perception and impassivity whenever Molyneux’s question is asked when the epistemic “immediacy” condition is emphasized.

Levin’s paper suggests that Locke’s answer to Molyneux’s question was not a precedent for Berkeley’s own infamous “heterogeneity” “no” answer, an answer based on the lack of ontological overlap between sight and touch, what Robert Schwartz in his essay calls, “perhaps the most contested feature of his theory of vision” (p. 203). Why? To put it in terms relevant to Amo’s impassivity claim is just to say that touch is impassive while vision is active—is of the mind—as it must be totally structured by the mind as it lacks any spatial relations otherwise. The non-spatial origin of the visual field has its upsides. As Schwartz explains, Berkeley needed no account for the inverted retinal image as, “The visual field simply has no orientation in physical space” (p. 208). Vision’s structure is constructed out of learned associations from touch, beginning with a bundle of sensations ordered into structured perceptions. For instance, as we approach an object, we perceive our own movement in a manner that can be correlated with the visual object’s increase in size. But what if the object increases in size when there is no movement? That should mean that the object is approaching us, that is, unless it is an object in the sky, like the moon. The moon illusion, incited by something like James Van Cleve’s own exclamation, “My, what an enormous moon!” (p. 218) is thus an incredible test case for Berkeley’s heterogeneity claim, one that can also be understood in Amo’s terms, helping us reconsider the claim that vision is wholly active.

How might Berkeley believe we see the moon? Van Cleve suggests two important conditions:

- 1 “The moon we see is a small yellow disc, but there is no small yellow disc where we take the moon to be, some 240,000 miles away (Berkeley 1948–1957: 44). The only object at that distance from us is the tangible moon” (p. 220).
- 2 “[N]othing is really at any distance from us, spatial distance being reducible to the length of time required to attain certain tangible ideas (p. 220).”

With these conditions comes a remarkable account, “Owing to the extra atmosphere, the moon is fainter at the horizon, and its faintness suggests to us larger size (p. 223).” Van Cleve also explains that faintness is equally a direct cue for greater distance. Normal human experience seems to support this contention. Say we gaze upon a mountain range, such as the Adirondacks, from a great distance such as the other side of Lake Champlain in Vermont. We see the small hills as darker, with the larger hills receding in the distance with greater faintness becoming “blued” by the atmosphere. But, as Van Cleve points out, these are visual experiences too. What of the necessary tactile training advised by Berkeley? And, moreover, not unlike the inverted image, the moon illusion does not even make sense as a visual experience with conditions (1) and (2). As Van Cleve asks, “But what is the phenomenon itself—what *is* it to see the moon as large?” (p. 226). And when we combine these two issues, we may be as confounded as Van Cleve!

When the horizon moon looks larger to me, I have no thought or impression whatever of any tangible attribute—no thought of hugging the astronomical moon, no thought of enclosing a silvery disk within my fingertips and feeling the distance between them proprioceptively, no thought of pressing my palm against an array of nubbly tangible points.

(p. 227)

And, as Van Cleve notes, Reid's own suggestion of a lawful ordering between intervening objects and a largeness of objects in visual experience, an explanation that sits well with Amo's own impassivity of perception, will not do as an answer to the moon illusion either, as even a visual expanse such as Lake Champlain will produce the illusion, a solution to which remains absent even to this day.

This part ends with a contrasting bookend to Amo's impassivity in Cavendish's extraordinary claim that all matter is mental and active, or "self-moving." Impassivity simply fails as an explanation for *anything* in the universe, which is a hive of interconnected parts all acting out according to their kind. How so? As Deborah Boyle explains in her chapter, using a simple example of seeing silk, "The eye's perception of the embroidered silk is constituted by the motions in the sensitive matter as it copies the motions of the matter that comprises the piece of silk" (p. 236). In other words, perception patterns the various properties of visual objects.

The basic picture is this: the sensible matter in, say, a human eye, copies the exterior motions of some object—say, an apple. Rational matter in the eye can copy motions, too—not the motions of the apple itself, but the motions of the sensitive matter that patterned out the apple.

(p. 236)

Apple perception entails, for Cavendish, that all matter is animate, a claim known as vitalism and opposite to Amo's impassivity. This is at once a benefit in that she grounds an argument in the inability of impassive claims to account for a set of perceptual errors, such as those discussed above regarding size, "the eye doth not see all objects according to the Magnitude, but sometimes bigger, sometimes less" (Cavendish 1664: 65–66; p. 243). But, as Boyle argues, Cavendish's vitalism also fails to account for perceptual error, as any faulty perception would just be a faulty movement of matter, a movement said to be perfect in accordance with its kind, though, as we notice from the moon illusion, no theory has resolved such problems. While the cognitive sciences have become a crucial resource in the philosophy of perception as we consider problems new and old, so too are *rewritten* histories told from novel contexts, offering a fresh understanding for both.

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9

ANTON WILHELM AMO AND THE PROBLEMS OF PERCEPTION

Chris Meyns

“The human mind”, Anton Wilhelm Amo writes at a crucial point in his work on the subject, “is a purely actual and immaterial substance” (1734: 4). Amo’s position has serious consequences. Among these is the result that the human mind cannot sense. Instead, he holds that sensation and the faculty of sensing only belong to the body.

Amo (c. 1703–c. 1759) was a legal scholar and natural philosopher working in eighteenth-century Prussia, including at the universities of Halle and Jena. He was among the first African professors in Europe. Representatives of the Dutch West India Company snatched toddler Amo from his home near Axim in Guinea (present-day Ghana), handing him as a “gift” to Duke Anthony Ulrich of Brunswick-Wolfenbüttel in 1707.¹ Only two of Amo’s main works are currently extant. He wrote *On the Rights of Moors in Europe* (*De jure Maurorum in Europa*, his 1729 law dissertation, presumed lost); *On the Impassivity of the Human Mind* of 1734, which I will focus on here; and *Treatise on the Art of Philosophizing Soberly and Accurately* (*Tractatus de arte sobrie et accurate philosophandi*), a work on logic published in 1738.² We know Amo lectured on the “most elegant and curious” parts of philosophy, physiognomy, political philosophy, and cryptography (Lochner 1958: 177; Abraham 1964: 77–78).

Amo’s radical claim about the mind occurs in his 1734 dissertation, fully titled *On the Impassivity of the Human Mind, or How Sensation and the Faculty of Sensing Are Absent from the Human Mind and Present in Our Organic and Living Body* (Lat. *Dissertatio inauguralis philosophica de humanae mentis ἀπαθεία, seu sensionis ac facultatis sentiendi in mente humana absentia et earum in corpore nostro organico ac vivo praesentia*). His stance that the mind cannot sense may sound extreme, but as I will show, he provides valid arguments and starts out from not too unreasonable assumptions. After presenting the structure of Amo’s text and his core concepts, I will discuss his three central theses and how he supports them. This allows me to pin down the exact positive position that Amo ends up with. I discuss three main possible objections to Amo’s views and indicate how he would be able to respond to them. I conclude that while Amo has the resources to resist two main concerns, a final skeptical objection falls outside of the more medically oriented framework in which he operates.

Amo’s project

Amo wrote *On the Impassivity of the Human Mind* for his doctorate at the University of Wittenberg. He had left the University of Halle, which had come under a spell of conservative

pietism under the influence of Johann Joachim Lange (1670–1744), opposing the more progressive, rationalist philosophy of scholars including Christian Thomasius (1655–1728) and Christian Wolff (1679–1754). Wolff was ousted from Halle in 1723, Thomasius died in 1728.

In his dissertation, Amo argues that the human mind does not suffer, have a passion, or undergo anything. In short, he claims that it is impassive—free from all passivity. Amo’s thesis is significant against the background of raving debates between two approaches: a mechanism in the Cartesian–Leibnizian tradition, on which body is strictly separate from the soul, and inanimate matter operates purely mechanically; and vitalist tendencies driven by the work of Georg Ernst Stahl (1660–1734), who held that in living organisms soul animates the body. Amo’s analysis of body and mind as strictly distinct easily makes him side him with the mechanists.

The work has a clear structure. Amo begins Chapter 1 by defining his central concepts, including “spirit” (*spiritus*), “human mind” (*mens humana*) (Part I); the predicates of “sensation” (*sensio*) and “faculty of sensing” (*facultas sentiendi*) (Part II); and how to understand the condition of “impassivity” (Part III). In Chapter 2 he explains how his central claim splits into three theses, and finally demonstrates what supports each of them.

Mental impassivity

What is the condition of impassivity that Amo says applies to the mind? In his Latin text, he uses the Greek *apatheia* (ἀπαθεία) untranslated. *Apatheia* is generally used to indicate a condition opposed to that having *pathos* (πάθος); that is, a condition without undergoing, feeling or suffering. In this light, it need be no surprise that the concept occurs prominently in the ancient Stoic philosophical tradition, signifying a person’s condition of being free from emotion.³ A further strand lies within the Latin Christian tradition, where *apatheia* is associated with the doctrine of divine “impassibility,” namely the idea that God is unable to suffer or undergo anything. Following this doctrine, God was understood to be wholly causally independent of anything else. Were God able to suffer they would (impossibly) be subject to another being’s actions.

Against this background, Amo defines impassivity specifically as the absence of sensation. If a being is impassive, it cannot sense and lacks a faculty of sensing (1734: 10). What exactly does it come down to for a being to lack sensation in this way? Amo defines “sensation” (*sensio*) and the faculty of sensing (*sentiendi facultas*) as, respectively:

SENSATION: Sensation in general is: sensible properties of directly present, material things really acting on the sense organs (1734: 10–11).

FACULTY OF SENSING: That disposition of our organic and living body, by means of which an animal is affected by material and sensible things and their immediate presence (1734: 11).

For example, on this line, the faculty of smelling consists just in the material, living body being so arranged that it is able to register odors when those are present. A sensation of smelling in turn is nothing other than an instance of the sense organs actually being stimulated by the presence of such odors. Hence, Amo analyzes sensation purely in terms of physical stimulation and does not require that sensation must be conscious.

On the surface, Amo’s account may seem to echo some of Leibniz’s statements on unconscious perception. According to Leibniz, we have a bulk of perceptions of which we are not aware. As he states in his *New Essays on Human Understanding*: “at every moment

there is in us an infinity of perceptions, unaccompanied by awareness or reflection” (Leibniz 1996: Preface), though he also notes that we can become conscious of these perceptions if our attention is drawn to them in instances of “apperception” (Leibniz 1996; 1969a: §4; 1969b: §14).⁴ Amo agrees that basic processes of sensation do not involve attention. As will become clear, he also accepts that a mind can become aware of sense operations by means of attention. However, his view differs from Leibniz’s on a crucial point. Where Leibniz thinks that unconscious processes of perceiving are always already representations in the soul, Amo captures sensation as a purely corporeal, non-representational process in which no soul or spirit is involved. Hence, despite some similarities, bare sensation fulfills a very different structural role for Amo than it does for Leibniz.

Amo’s definitions clarify that he thinks that sensation involves bodily things, and that whoever senses is in some way being acted upon. Only organic, living bodies disposed in a certain way can have faculties of sensing. Moreover, signaling a broad usage, Amo notes that he also regards what Descartes in *Passions of the Soul* calls “inner senses” and affections of the soul (*animi pathemata*) as sensation (1734: 11).

The human mind, on Amo’s picture, belongs to the genus of spirit, which is characterized as, “whatever substance is purely actual, immaterial, always understanding through itself”, that is, understanding directly.⁵ Spirits are conscious and operate spontaneously, by means of intentions or representations of the soul (1734: 4). Human minds are distinctive in the category of spirit, because they are those spirits which relate to a living, organic body: “The human mind is: a purely actual and immaterial substance which, in exchange (*commercio*) with the living and organic body in which it is, understands and operates through intentions, for a purpose and conscious end” (1734: 8). In short, Amo sees human minds as immaterial, purely actual, conscious beings that exist in living, organic bodies.

Scholars disagree on how Amo views the relation between mind and body. Jacob Emmanuel Mabe classifies Amo as a defender of a (slightly dubious sounding) “dualistic materialism” (Mabe 2014: 76). Both Victor U. Emma-Adamah (2015: 156) and Justin E. H. Smith (2015: 223–227) suggest that Amo accepts a pre-established harmony in the spirit of Leibniz. The latter would make contextual sense but is contentious in relation to his text. Amo nowhere cites Leibniz or Wolff in *On the Impassivity*, nor does he use terms like “harmony,” “concord,” or “correspondence.” Amo’s affinity with a Leibniz–Wolffian mechanism and resistance to vitalism does not settle that he must hold this specific positive position, as a flood of alternative theoretical options on the soul–body relation is equally available. Hence I regard Amo as a (mechanist) dualist and hold off on classifying him as a harmony theorist.

Amo wants to show that an immaterial, actual, conscious being in a living body does not sense. One might think that conclusion follows almost by definition. Amo stipulates that certain beings are “not suited” (*non apto*) to have sensation, mentioning stones and spirits as examples of such unsuitable subjects (1734: 12). Nonetheless, even if the conclusion is within reach, Amo needs to do some work to motivate why this would be so. He does so by specifying his main claim into three theses, two negative and one positive (1734: 15–18):

- T1. The human mind is not affected by sensible things.
- T2. There is no faculty of sensing in the human mind.
- T3. Sensation and the faculty of sensing belong to the body.

He defends each separately.

Support for T1

In support of T1, Amo proposes three proofs. Two of these proofs center around questions of property entailment. In proof 1, Amo argues that sensing entails other attributes that would be incompatible with the soul:

Whatever senses, lives; whatever lives, nourishes; whatever lives and nourishes, grows; whatever exists in this way, is ultimately resolved into its first principle; whatever resolves into its first principle, is a composite (*principiatum*); each composite has its constitutive parts; whatever exists in this way, is a divisible body; hence if the human mind were to sense, it follows it would be a divisible body.

(1734: 15)

One might object at several points to this reasoning. Do living and sensing really entail one another? Amo insists so: “To live and to sense are two inseparable predicates” (1734: 16). Further, some, such as Thomas Hobbes, will happily accept that all processes traditionally referred to “incorporeal things” are in fact bodily (viz. *Leviathan* 4.46). Hence, Amo already assumes that the mind is not a divisible body.

In a later proof, Amo attempts a similar line. Drawing on religious authority, he notes that no one needs to fear bodily death because souls cannot perish with the body. From this point, Amo draws out further implications about living, schematically:

- L1. Whatever can die, lives (ass.).
- L2. If it lives, then it senses (ass.).
- L3. If it senses, it enjoys the faculty of sensing (ass.).
- L4. The body can die (Math. X, 28).
- L5. The body lives (from L1, L4).
- L6. The body senses (from L2, L5).
- L7. The body enjoys the faculty of sensing (from L3, L6).

To establish the soul’s inability to sense, Amo would presumably want to flip the argument around, so that the converse would apply to the soul, as in:

- L8. The soul cannot die (Math. X, 28).
- L9. The soul does not live (from L1, L8).
- L10. The soul does not sense (from L2, L9).
- L11. The soul does not enjoy the faculty of sensing (from L3, L10).

But, of course, the inference at L9 is invalid, blocking steps L10–L11. Nothing in L1 settles how the property of living relates to the inability to die. Something unable to die might just as well live forever.

The most significant support for T1 comes when Amo (in Proof 2) postulates a general exclusion, writing, “No spirit senses material things; and yet the human mind is a Spirit, therefore it does not sense material things” (1734: 15). Formally:

- S1. Spirit does not sense material things.
- S2. The human mind is a spirit.
- S3. The human mind does not sense material things.

As Amo takes S2 as an instance of genus-species classification, he holds that it does not allow for contradiction (1734: 15–16). The major S1, however, is a different story. Amo feels he has already supported it in his earlier definition of spirit. Updating the argument for completeness, it would look as follows:

- S'1. Spirit is purely actual (ass.).
- S'2. Whatever is purely actual does admit passion (ass.).
- S'3. Spirit does not admit passion (from S'1, S'2).
- S'4. To admit passion is to sense material things (ass.).
- S'5. Spirit does not sense material things (from S'3, S'4).
- S'6. The human mind is a spirit (ass.).
- S'7. The human mind does not sense material things (from S'5, S'6).

Here, S'1 is simply Amo's definition of spirit. I have supplied S'2 and S'4, making explicit the reasoning and the work Amo wants the argument to do.

S'4 should be fine if passion (or passivity) and sensation are equivalents, as Amo thinks. He seeks to demonstrate the mind's impassivity by showing that a mind cannot have sensation. In the background here is that Amo has defined "sensation" as a condition in which material things operate on the sense organ (1734: 10–11) and where being operated on is a passive relation.

Point S'2 should not be too controversial. For any set of opposites, if something is wholly A, then it cannot also simultaneously be wholly not-A. Something 100-percent waterproof cannot at the same time be 40-percent leaky. Hence, if we understand passivity as potentiality and assume that potentiality opposes actuality, then whatever is fully actual cannot also at the same time be to a certain extent non-actual, as S'2 states. Hence, here Amo demonstrates the human mind's incapacity to sense.⁶ Surprisingly, even though he has already inferred it, he subsequently offers an additional proof of point S'5. His reasoning is insightful about his wider picture of sense perception.

Amo's demonstrates S'5 by elimination. If a spirit were to have passion, that would have to happen either by communication, or by penetration, or through contact (1734: 5). But if none of these options works, then spirit cannot have passion. Let's take communication first. Amo defines communication as "The extent to which the *Parts, properties* and *effects* of one being, by means of some act, come to be present in another being analogously and aptly" (1734: 5). For example, when I warm my hands near the fire, the heat of fire gets communicated (transfers) from the fire to my hands. Spirits cannot have this, Amo argues:

No parts, properties and other effects of a being can come to be present in a spirit by means of some act; otherwise spirit would contain in its essence and substance something other than what it ought to contain. Likewise, to contain, and to be contained are material concepts, which cannot truly be predicated of spirit. Therefore spirit does not sense by communication.

(1734: 5)

Through communication, spirit would come to contain something of another substance in itself; a part, property or effect. But spirits, which we presume are simple, cannot contain extrinsic things. The whole notion of the containment (*continere*) is only applicable to material things, which spirit is not.

Pushing ahead, Amo adds that sensible beings and spirits are "contrary opposites" (*contrarie oppositae*): they are comparable, but the one lacks a defining property which the other

has (e.g., material and nonmaterial) (1734: 8). No contrary opposites can communicate. Hence, communication thrice fails for spirits.

Similarly, spirits have passion by penetration, in which parts of one being transfer to another, Amo notes (1734: 5). Spirits cannot be penetrated, because spirits do not have parts: “No spirit senses or is affected by way of penetration, because penetration is: The transition of a being through parts of another being; but no spirit enjoys constitutive parts; Therefore; <spirit> is beyond all passion” (1734: 6). Here too Amo relies on definitions, namely of spirit as unitary. If spirits indeed lack parts, they cannot be penetrated.

Amo’s reasoning on part-free spirits reflects early modern and medieval debates. Just two decades prior, Leibniz, in *Monadology* (1969b), insisted that spirits are partless because they are not material and that whatever lacks parts cannot be acted upon. After introducing the monad as “a simple substance ... without parts” (Leibniz 1969b: §1), Leibniz notes:

There is also no way of explaining how a Monad can be altered or changed in its inner being by any other created thing, since there is no possibility of transposition within it, nor can we conceive of any internal movement which can be produced, directed, increased or diminished there within the substance, such as can take place in the case of composites where a change can occur among the parts.

(Leibniz 1969b: §7)

If partless substances cannot be changed by being acted upon, then they must be their own principles of activity. While Amo does not cite Leibniz, he draws on similar arguments in resisting the idea that minds could be penetrated.

Finally, spirit could not sense through contact (*contactum*). Amo describes contact as: “The extent to which two surfaces in some physical or sensible point in some way mutually touch” (1734: 5). Contact by definition involves touch. As Descartes had shown—Amo cites Descartes’ correspondence with Elisabeth of Bohemia—touch is a characteristic only applicable to body (1734: 6). Spirit is not body, hence spirit cannot touch, and so not be in contact with anything. In this argument, as in others, Amo mobilizes a basic incompatibility between spirit and body. He does not present it as a brute fact because he offers wider considerations (about opposites, parts, contact), but it does stand out as a core premise.

With no option remaining for spirit to sense, that completes Amo’s additional proof of claim S’5 that spirit lacks sensation. These three proofs settle Thesis 1, that the human mind does not sense. Amo’s support for T2 and T3 is more succinct.

Support for T2

For T2, Amo offers just a single proof, which again considers the intertwinement between various properties: “To that to which the circulation of the blood belongs, to that also belongs the principle of life; and to which this belongs, also belongs the faculty of sensing; Anyway, the circulation of the blood & the principle of life belong to the body” (1734: 17).

Amo must assume these options to be exclusive and exhaustive, such that sensing (living, blood circulation) must belong either to body or to mind but not to both, and so if it belongs to the body, it cannot belong to the mind. This support for T2 is relevant because it shows how Amo backs up his reasoning with the medical science of his time, explicitly referring to several recent texts in physiology (Johann Gottfried Berger’s *Physiologia*, 1702; and Christian Vater’s *Physiologia experimentalis*, 1712).

Support for T3

Amo's proof of T3, brief and relying on prior results, finally explicates the direct exclusion principle that already surfaced earlier: "Sensation and the faculty of sensing belong either to the mind, or to the body, not to the mind, as has been extensively deduced. Therefore <they belong> to the body" (1734: 18).

With those points in hand, Amo has offered support for all three theses (T1–T3) of his central claim that the human mind is impassive. What positive picture of the mind results?

Active mind

The human mind, as far as Amo is concerned, does not sense. Rather, mind operates fully spontaneously and uses the body as an instrument in its operations. Amo states that spirit is: "always understanding through itself, and operates spontaneously with intention, for a purpose and conscious end (*conscium finem*)" (1734: 4), and, later, "Every spirit operates spontaneously i.e. intrinsically determines its operations toward an end to be pursued, nor is it in any other way forced to operate" (1734: 7). How do we know that spirit operates spontaneously? We know this, because:

If spirit were forced by another, this would happen either with another spirit or matter forcing. If another spirit, that preserves in both the spontaneity or the faculty to freely act and react. If spirit were forced by matter, it would not be able to, because spirit is always actual, while matter is always something undergoing (*patiens*), and receiving all action operating upon it.

(1734: 7)

Matter is always passive, says Amo, therein following a long tradition reaching back through medieval philosophy all the way to ancient Greece. If matter is always passive, then it cannot act upon things—spirit included. Surprisingly, Amo seems to allow that spirit could force (act upon) another spirit. Though he immediately suggests that if one spirit were to force another, it would still not detract from neither spirit's spontaneous operation. My shot is that Amo thinks that any spirit would still have to perform those "forced" acts itself, from its own intentions. Hence even a forced spirit would still be operating spontaneously. This analysis has implications for the relation between the human mind and its organic, living body.

Amo suggests that the human mind uses the body as its "instrument" or "medium," using sensations occurring in the body. That Amo allows a form of mind–body exchange may sound surprising, as he strongly denies that a body could act upon the soul. But we can make sense of such interactions as asymmetric relations. Exchanges need not be two-way things: "Exchange of body and mind consists in this (1) it [sc. the human mind] uses the body in which it is as subject (2) as instrument and medium of its operations" (1734: 8).

In explaining (T1), Amo had said of the human mind that it understands and uses sensations appearing in the body (1734: 15). We can then conceive of the full process as follows:

Stage 1. Sensible things are present to the body, stimulating the sense organs.

Stage 2. The soul attends to the sensory organ as it is stimulated and commences its own operation.

The process of sensation itself, presented here as Stage 1, does not involve the soul nor any instances of attending. Were we to put it in terms of conscious or unconscious processes, then whatever happens at Stage 1 is not conscious. Stage 2, however, does involve processes that could classify as “conscious,” in so far as it involves the soul’s acts of attending. Stage 1 involves the purely corporeal, mechanical process of sensation, whereas Stage 2 is initiated spontaneously by the mind. Crucially, this requires no extrinsic properties to transfer into, or be contained in, spirit. All it requires is the soul’s attention and subsequent spontaneous action. Amo insists that mind and body still remain strictly separate in any such exchange:

Likewise we there do not confuse the diverse aspects of the body and the mind coming together. For whatever consists in the pure operation of the mind, is to be attributed only to the mind; whatever truly presupposes sensation, the faculty of sensing, and concepts involving matter, is all to be attributed to the body.

(1734: 18)

When I use my phone to communicate or determine my location, I nonetheless remain distinct from it. Similarly, a mind that uses a body as an instrument still remains distinct from it. Sensation and the faculty of sensing belong to the body, while the mind operates spontaneously.

With Amo’s reasoning out there, I will consider several points of pushback that it might face. For example, Amo’s definition of sensing as passive was central to one of his proofs of T1 but can be challenged from a strand of thinking about sense perception as active.

Pushback 1: Active sensing

Plotinus (c. 205–270) insisted that perception is an act of mind: “Perceptions are no imprints, we have said, are not to be thought of as seal-impressions on soul or mind,” continuing that, instead, “[t]he mind affirms something not contained within it: this is precisely the characteristic of a power—not to accept impression but, within its allotted sphere, to act” (Plotinus 1966: IV.6, §§1, 2). Similarly, Augustine (354–430) writes about a case of seeing a body:

[L]et us remember how these three things, although diverse in nature, are tempered together into a kind of unity; that is, the form of the body which is seen, and the image of it impressed on the sense, which is vision or sense informed, and the will of the mind which applies the sense to the sensible thing, and retains the vision itself in it. [...] But the third is of the soul alone, because it is the will.

(Augustine 2002: 11.5)

Perceiving, for Augustine, is never simply a case of objects passively impressing something on the soul. It also always involves an act of the soul itself.⁷ Similar considerations about how perception must involve an active element come up in Themistius (317–390), Simplicius (c. 490–c. 560), Boethius (c. 480–524), Averroes (1126–1198), and Nicholas of Cusa (1401–1464), among many others.⁸

Why accept a theory of active perception? One reason lies in metaphysics. Augustine and others assumed a metaphysical hierarchy, where causation only flows in one direction: the ontologically nobler can act upon the ontologically less noble, not the other way around (except by a mode of resistance). As immaterial spirits are assumed to be metaphysically nobler than body, body must be assumed to be unable to act upon spirit.⁹

Even Descartes, to whom Amo regularly refers, is a candidate for a theorist of active perception, but for different reasons. In his sixth set of replies to objections to his *Meditations*, Descartes distinguishes three grades of perception. The first grade concerns purely corporeal stimulation by external objects, the second “everything that immediately results in the mind on account of its being united to the bodily organ that is affected,” such as bodily feelings, emotion, sensation. Of the final grade, Descartes states: “The third grade includes all the judgments that, on the occasion of motions in the bodily organs, we have been accustomed to make since childhood about things existing outside us” (Descartes 1964–1976: VII, 437). Judging is an act, hence Cartesian perception is at least to this extent active.¹⁰

Descartes had distinguished grades of perception in response to Marin Mersenne’s (1588–1648) charge that—contrary to Descartes’s claims—the senses are actually more reliable than the intellect. Distinguishing these grades of perception allows Descartes to pinpoint the risk of error in the perceptual process. Perceptual Grades 1 and 2 are error-free: “For it is clear that we are not dealing here with the first and second levels of sensation, because there can be no falsity in them” (Descartes 1964–1976: VII, 438). In Grade 3, however, we are active and can make (or fix) mistakes: “And therefore this very example shows that only the intellect can correct the errors of the senses; nor can any example be found of error due to trusting the operations of the mind rather than the senses” (Descartes 1964–1976: VII, 439). To explain the possibility of perceptual error, Descartes resorts to active perception.¹¹

This brings up two reasons for accepting sense perception as active. One, with Augustine and others, the consideration that body is metaphysically less noble than spirit, and so—assuming associated restrictions on causation—would not be able to act upon spirit. Since spirit still perceives, its perception must be its own act. Another epistemical, as discussed for Descartes, where distinguishing an active stage of perception can help to account for the possibility of perceptual error. While passive “effects” of sensory stimulation cannot be erroneous, our perceptual judgments may slip. Would either of these concerns put pressure on Amo?

Amo need not be moved by either argument. First, Amo’s work contains remarkable parallels with Neoplatonist ideas about metaphysical hierarchy. While Amo does not invoke the doctrine that spirit would be metaphysically nobler than the body, his insistence on the soul’s impassivity ties in with this idea, as well as with the later religious doctrine that God cannot be acted upon or suffer from the actions of another being. Further, Amo even agrees with authors in that tradition on aspects of process: bodily sense organs are stimulated, the souls acts of itself. However, he parts ways with the tradition on classification. While Plotinus and Augustine see the act of the soul as sense perception, Amo insists that sensation is restricted to the stimulation of corporeal sense organs. Without further criteria of what a theory of sense perception must explain, either party could insist that they capture the process correctly—giving either a more inclusive or a more minimalist account of the process. Hence, Amo need feel no pressure to expand his classification of “sensing” to include acts of mind.

Similarly for the epistemic point. Amo could endorse elements of Descartes’s grades of perception. He agrees that material things stimulate the sense organ (Descartes’ Grade 1). He also accepts that the soul acts (Grade 3). But he denies that anything—feelings, emotions, sensation—could be produced in the mind as a direct result of its attachment to the body (Grade 2). Because it would amount to an instance of the mind being (impossibly) passive and acted upon, Amo denies that anything takes place of the kind that Descartes captures as Grade 2 of perception. Sure, the mind can be in a variety of contentful states. However, on his analysis, no state of the mind will ever be directly caused by the body’s operation.

Descartes sought to differentiate between grades of perception to explain the possibility of perceptual error. Could Amo accommodate the possibility of error with a different overall analysis? Were he so inclined, he could explain error as resulting from the mind's own, active judgments. He would simply deny that this would be sense perception.

Even Descartes seems flexible on the exact source of perceptual error, attributing the third grade of "perception" solely to intellect. After discussing how a stick half-immersed in water looks crooked, Descartes notes (1964–1976: VII, 437–438):

For when I judge, from this sensation of colour by which I am affected, that the stick, existing outside me, is coloured, and when I estimate its size, shape, and distance from the extension and the boundaries of this colour and from the relation of its position to the parts of the brain, even though these activities are commonly ascribed to the senses, for which reason I included them here in the third level of sensation, it is nonetheless clear that they depend on the intellect alone.

If acknowledging the mind's activity suffices for explaining possible error, then whether one classifies this process as "perception" (as Descartes does) or not (as Amo would have it) does not make any argumentative difference. Hence, Amo also has the means to resist this pressure to broaden the category of sensation on epistemic grounds.

While this settles the first pushback, more aspects of Amo's work can be challenged. How about his assumption that spirit is purely actual?

Pushback 2: Spiritual passion

In *Passions of the Soul* (1649), Descartes had stated that the mind can be acted upon, or have passions. In one of his broader definitions, he notes:

In the first place, I note that whatever takes place or occurs is generally called by philosophers a "passion" with regard to the subject to which it happens and an "action" with regard to that which makes it happen. Thus, although an agent and patient are often quite different, an action and passion must always be a single thing which has these two names on account of the two different subjects to which it may be related.

(Descartes 1964–1976: IX, 328)

On that line, any occurrence necessarily always has two dimensions—active and passive—but classifies as "action" or "passion" depending on how it is considered. An occurrence is an action for whatever caused it (which for Descartes could be the mind itself, or something external to the mind), but a passion for the subject in or to which it occurs. When you kick me, I am kicked. The same event is a kicking on your part (the agent) and a getting-kicked for me (the one subject to it). Hence, the occurrence is at once an action (as far as you are concerned) and a passion (for me).

Elsewhere, Descartes provides a stricter account of passions, classifying passions as "perceptions" (that is, as "modes of knowledge" or representations) with a specific cause, namely "we may define them generally as those perceptions, sensations or emotions of the soul which we refer particularly to it, and which are caused, maintained and strengthened by some movements of the spirits" (1964–1976: IX, 349). Here Descartes builds upon his distinction between three different kinds (not grades) of perceptions, based on what they are "referred" to, that is, what we judge them to be caused by:

EXTERNAL SENSATIONS: perceptions caused by objects outside us.

INTERNAL SENSATIONS: perceptions caused by the natural appetites of our body.

PASSIONS: perceptions caused by our soul.

(Descartes 1964–1976: IX, 345–348)

In this narrow sense, passions, for Descartes, are those perceptions that we judge to be caused by the soul and “whose effects we feel as being in the soul itself” (Descartes 1964–1976: IX, 347).

What Descartes says about passions need not worry Amo, for two reasons. For one thing, while Descartes presents an overview, he omits any argument for why his inventory of states of the soul is correct. Without such argument, Amo can simply offer a different inventory, leaving the two authors argumentatively on a par—Descartes allowing passion in the mind, Amo resisting it.

More significantly, Amo could pick up on Descartes’s admission that his “passion” of the soul, those perceptions we refer to the soul itself, “is really one and the same thing as a volition” (Descartes 1964–1976: IX, 343). Volitions are actions of the soul. Amo could insist that if an act is performed by the soul, it must count not as a passion but as an action of the soul. As though anticipating such a concern, Descartes explicates that these perceptions are best captured as passions because ultimately we passively perceive this act of willing:

And although willing something is an action with respect to our soul, the perception of such willing may be said to be a passion in the soul. But because this perception is really one and the same thing as a volition, and names are always determined by whatever is most noble, we do not normally call it a “passion,” but solely an “action.”

(Descartes 1964–1976: IX, 343)

In short, Descartes falls back on conventional classification when insisting that the soul has passions. Amo has addressed part of Descartes’ stance when discussing whether a spirit’s spontaneous action could be compromised by an external force. He ruled this out because any external force would still be forcing the soul’s spontaneous action. This suggests that Amo takes it as a general rule that whatever occurs in a spirit is a spontaneous action of that spirit. Hence, what Descartes classifies as the soul’s passions, Amo would still understand as a mental act.

Amo may here be pushing back against a Cartesian strict separation between intellect and will. Where Descartes allows intellect as receptive (passive apprehension) and will as active (judgment, involving assent), Amo brings these two closer together, attributing any reflection to an act of mind. This is a disagreement, of course. But it is not one that can be decided in either party’s favor without further criteria or evidence.

Pushback 3: Epistemic risk

Here is a final, still more serious, issue. Some, including Descartes, have given the passivity of sensation an argumentative role in demonstrating the existence of body (Descartes 1964–1976: VII, 79–80). When, in *Meditation VI*, Descartes describes all of his sensations, he insists that he cannot but have these sensory ideas:

And surely it was not without reason that, on account of the ideas of all these qualities that presented themselves to my thought, and of which alone I had personal and immediate sensations, I believed I was sensing certain things quite

distinct from my thought, that is to say, bodies from which these ideas proceeded. For I experienced these ideas as coming to me without any consent of mine.

(Descartes 1964–1976: VII, 75)

We can reconstruct Descartes's claim and subsequent proof of the existence of body (Descartes 1964–1976: VII, 79–80) as follows:

- PB1. Sensible ideas are produced either by me or by something other than me (ass.).
- PB2. If sensible ideas were produced by me, they would not occur against my will (ass.).
- PB3. Sensible ideas do occur against my will (ass.).
- PB4. Sensible ideas are not produced by me (from PB2, PB3).
- PB5. Sensible ideas are produced by something other than me (from PB1, PB4).
- PB6. If sensible ideas are produced by something other than me, they are produced either by god, or by body (ass.).
- PB7. Sensible ideas are produced either by God, or by body (from PB5, PB6).
- PB8. If sensible ideas were produce in me by god, then they would come from something which does not formally¹² contain the objective reality of these ideas (ass.).
- PB9. If sensible ideas would were produced by something which does not formally contain the objective reality of these ideas, then god would be a deceiver (ass.).
- PB10. God is no deceiver (ass.).
- PB11. Sensible ideas are not produced by something which does not formally contain the objective reality of these ideas (from PB9, PB10).
- PB12. Sensible ideas are not produced by god (from PB8, PB11).
- PB13. Sensible ideas are produced by body (from PB7, PB12).
- PB14. If sensible ideas are produced by body, then body exists (ass.).
- PB15. Body exist (from PB13, PB14).

Descartes uses the observation that I do not produce certain of my sensory ideas to argue for the conclusion that bodily things exist. Bodies' causal effect on my cognition affirms their existence. If I did produce all of my ideas, as Amo insists, then this proof of the existence of bodily things would not go through.

Amo would likely want to resist PB3, that sensible ideas occur against my will, or against the soul's action. Indeed, he would be happy to accept that sensible things—light, sounds, odors, flavors, or tactile properties—can stimulate a body's sense organs unsolicited. However, none of those processes of corporeal stimulation amounts to the soul's having ideas against its will. This is because the soul on Amo's picture only experiences when it attends, and attending is not something that unwittingly happens to the soul; it is the soul's own action.

Amo has urged that spirit operates spontaneously, that is, through its own intentions, and that it determines its operations (1734: 7–8), including the operation of attending to what occurs in the body. But the dialectic is murky here. If spirit indeed operates spontaneously, then that contradicts Descartes's supposed "datum" in PB3 that sensible ideas can occur against my will. And if PB3 is to be given up, none of the inferences depending on it can go through either.

Consider two main issues. First, if the soul does not sense, and hence receives no confirmation of the existence of body through being causally affected by body, can Amo demonstrate that body exists in some other way? While Amo defines the human mind as

being “in” a living, organic body, nothing he has said so far rules out that (at least epistemically) this corporeal instrument and its user could be detached from one another. Second, if sensory ideas are spontaneously self-produced, does cognition on Amo’s model still in any way latch onto corporeal things in the world? Or would it float freely in epistemic isolation?

Amo can avoid a risk of epistemic isolation. Yes, he argues that spirit operates spontaneously. But spontaneous thought need not be baseless. Amo says that the mind uses bodily sensations as an instrument or medium (1734: 8). Elaborating on T1, he notes, “the human mind is not affected by sensible things, although they are closely present to the body in which it is; But it understands sensations appearing in the body, and uses <these> understandings in its operations” (1734: 15). As sketched, a possible account of the “exchange” Amo envisages would have it that sensible things operate on the body while the soul attends to the stimulation and commences its own operation. Only with the mind’s attending is there a conscious awareness. On this picture, the mind’s spontaneous acts are produced while using what happens in the body. Bodily stimulation does not cause the mind’s operation. Rather, it provides the mind an occasion to operate. Instruments—be they forks, phones, or bodies—can be useful even if they do not cause their user to operate. If the mind uses corporeal stimulation as its starting point in spontaneous action, then that case of instrument use circumvents the risk of cognition ending up free-floating, severed from corporeality.

Things are different for the proof of the existence of body. Amo gladly accepts that there is such a thing as body. He directly refers to body, and requires it in his analysis of sensation in T3. All the same, it looks like Amo is not too concerned about wider metaphysical or skeptical questions about body’s existence. Instead, within the context of his dissertation, he regards such questions either as settled, or as no suitable object of his own philosophical inquiries.

Indirect support for this diagnosis lies in the debates that Amo orients himself toward, which are mostly physiological. He rejects the Wittenbergian physician and chemist Daniel Sennert’s (1572–1637) view that the mind senses, discusses Jean Leclerc’s (1657–1736) treatise of spirit (*Pneumatologia*, 1710), and references work by the surgeon Georg Daniel Coschwitz (1679–1729), a follower of Stahl’s vitalism. When Amo cites Descartes, he focuses on questions about perception, not on broader metaphysical doubts. Amo ventures into topics of physiology, but his comments on the wider physics of, say, visual perception (optics) are limited. Given this, he seems unconcerned to refute a skeptic about the existence of body but silently presumes these issues dealt with.

Conclusion

Anton Wilhelm Amo offers the radical stance that the human mind cannot have sense perception, as defended in *On the Impassivity of the Human Mind*. Zooming in on Amo’s three main theses—(T1) that the human mind does not sense; (T2) that the human mind does not have a faculty of sensing; and (T3) that sense perception belongs to the body, I have shown that much of his reasoning relies on assumptions that spirit must be purely active and that spirit excludes anything bodily. Amo radicalizes the Cartesian separation of spirit and body, ending up with a causal asymmetry: while no body can act upon mind, minds can use bodies as instruments in their operation. Around these ideas Amo builds his arguments that the human mind does not sense, and only ever acts spontaneously.

Within the wider early modern perception debate, Amo can expect several lines of pushback, of which I here considered three:

- 1 Could perception be active?
- 2 Could passivity be realized in spirit? and
- 3 Does spontaneous cognition carry substantial epistemic risk?

Amo has the material to ward off most these challenges. On (1), he broadly agrees with active perception theorists on matters of process (a sense organ gets stimulated, the mind is active), but has grounds to resist classifying the mind's activity as "perception." On (2), he can insist that there is insufficient evidence to conclude that the mind experiences its own acts passively; all we know for sure is simply that the mind itself acts. On issues of epistemic risk, (3), Amo's results are mixed. While he can resist any concerns about spontaneously operating minds ending up "free-floating" from corporeality, skeptical issues about the very existence of body will draw a blank. Perhaps that need not be a major issue. Immersed in early eighteenth-century physiological approaches to sense perception, Amo has at this point simply stepped away from a wider skeptical framework that might underpin such worries.

Notes

- 1 Facts about Amo's life are scarce and sometimes disputed. Biographical notes on Amo can be found in: Lochner (1958); Abraham (1964, 2008); Brentjes (1976); Bess (1989); and Sephocle (1992). As Hountondji (1996) and Damis (2002) correctly note, much of the literature has "instrumentalized" Amo, focusing mainly on his extraordinary life while ignoring his actual work. Change is on its way, though, with more studies recently touching on Amo's philosophy of mind, including Hountondji (1996), Wiredu (2004), Mabe (2014), Smith (2015), and Emma-Adamah (2015).
- 2 A text by Johannes Theodosius Meiner (1734), which Amo supervised, is sometimes also attributed to Amo.
- 3 *Apatheia* is discussed as the absence of emotion in persons by, among others, Zeno of Citium, Dionysius of Heraclea, Democritus, and in Epictetus's *Discourses* (Epictetus 1768: 4.64.6).
- 4 See Kulstad (1981, 1991); McRae (1976); Theil (1994); and Jorgensen (2009, 2011) for canonical discussions of Leibniz on grades of perception and apperception.
- 5 Hountondji has argued that Amo's claim that the human mind uses the body for cognition "is tantamount to saying that the human mind cannot be regarded as a particular species of the genus spirit" (1996: 125). As will become clear below, this is incorrect. Hence here I will stick to Amo's classification.
- 6 Wiredu (2004: 203–205) surprisingly states that Amo's discussion of activity and passivity adds nothing to his argument against Descartes. Instead, they propose that with this move Amo may idiosyncratically have been pushing influences of the Akan thought that he would have been exposed to as a three-year-old toddler. However, Wiredu misrepresents aspects of Descartes position and ignores how concerns about active and passive perception build upon a long Aristotelian–scholastic tradition in which Amo would have received formal instruction. Taking that into account, we can see how, in using arguments about activity and passivity, Amo is in no way idiosyncratic but builds upon a received body of thought.
- 7 For more on Plotinus on perception, see Blumenthal (1971) and Emilsson (1988); for Augustine, O'Daly (1987: chapters 3–5) and Byers (2012) provide extended studies.
- 8 See Pasnau (1997: chapter 4), Spruit (2008), and Silva and Yrjönsuuri (2014) for studies on active perception in medieval and early modern debates.
- 9 Silva describes Augustine's stance on metaphysical nobility as follows: "the soul's activity guarantees the inviolability of the basic ontological principles of the superiority of the soul over the body" (2014: 117). See also Leijenhorst (2014: 169), and Menn (2002: 153).
- 10 Descartes's stance on active perception has recently been taken up by Wee (2014) as well as in Leijenhorst (2014: 179–180).
- 11 Casting Descartes as a theorist of active perception may be surprising, as he regularly emphasizes perception's passivity: "Moreover, there is in me a certain passive faculty of sensation, that is, of receiving and knowing ideas of sensible things" (Descartes 1964–1976: VII, 79). However, while grades 1–2 stand out as mere "effects" on the sense organs and in turn the soul, his claims in the sixth set of replies signal that these only account for part of the perceptual process.

- 12 Following scholastic terminology, formal containment is something's belonging to a thing's form or nature (essence). It contrasts with objective containment (having it in the mind) or for Descartes in this passage with eminent containment (designating how everything are contained in God).

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10

LOCKE ON MOLYNEUX'S QUESTION AND PERCEPTUAL CONCEPTS OF SHAPE

Janet Levin

Molyneux's question, as proposed by William Molyneux to Locke (1693), and published in (the second edition of) Locke's *Essay* (1694; II.ix.8), is this:

Suppose a man born blind, and now adult, and taught by his touch to distinguish between a cube and a globe of the same metal, and nighly of the same bigness, so as to tell when he felt one and the other, which is the cube and which the globe. Suppose then the cube and globe placed on a table, and the blind man made to see: Quaere, whether by his sight, before he touched them, he could now distinguish, and tell, which is the globe, which the cube.

Molyneux conjectured, Locke reports, that the man born blind (MBB) would *not* be able to do this:

For though he has obtain'd the experience of, how a Globe, how a Cube, affects his touch; yet he has not yet attained the Experience, that what affects his touch so or so, must affect his sight so or so; Or that a protuberant angle in the Cube, that pressed his hand unequally, shall appear to his eye as it does in the Cube.

Locke goes on to agree with Molyneux, claiming that he is "of the opinion that the Blind Man, at first sight, would not be able with certainty to say, which was the Globe, which the Cube, whilst he only saw them; though he can unerringly name them by his touch, and certainly distinguish them by the difference of their Figures felt" (*Essay* II.ix.8).

Most of Locke's contemporaries, e.g., Berkeley, Diderot, Leibniz, and Molyneux himself, take the question to be whether there are common "ideas" of spatial figures afforded by sight and touch, or rather two distinct, modality-specific, sets of ideas which we (quickly and almost unconsciously) learn to associate in our normal visual and tactual experience of the world. This is also the question addressed by most current writers who take Molyneux's question to have significance for contemporary debates about cross-modal perception.¹

However, as some commentators (e.g., Mackie 1976, Berchielli 2002, and Bruno and Mandelbaum 2010) argue, a look at the context in which Locke introduces Molyneux's

question (in *Essay II.ix.8*) suggests that his primary concern may be quite different.² After all, Locke begins this chapter, entitled “Of Perception”, by specifying that no impingement on our sense organs will count as perception unless it produces an idea in our minds, and notes further that many of these ideas are produced very early on in children, even when in the womb (§5).³ But, as he goes on to note:

We are farther to consider ... that the Ideas we receive by sensation, are often in grown People altered by the Judgment, without our taking notice of it. When we set before our Eyes a round Globe, of any uniform colour ... 'tis certain that the Idea thereby imprinted in our Mind, is of a flat Circle variously shadow'd, with several degrees of Light and Brightness coming to our Eyes. But we having by use been accustomed to perceive, what kind of appearance convex bodies are wont to make in us; what alterations are made in the reflection of Light, by the difference of the sensible Figures of Bodies, the Judgment presently, by an habitual custom, alters the Appearance into their Causes: So that from that, which truly is variety of shadow or colour, collecting the Figure, it makes it pass for a mark of Figure, and frames to itself the perception of a convex Figure, and an uniform Colour; when the Idea we receive from thence, is only a Plain variously coloured.

(*Essay II.ix.8*)

Locke's stated concern in this passage is to explain how we can come to recognize or identify 3D figures such as globes by sight, given that “the Idea thereby imprinted in our Mind” when we look at a globe is a “flat Circle variously shadow'd.” As he puts it, he's interested in examining the role of “Judgment” in visual perception, in particular, how judgment can “alter” “Ideas we receive by sensation.” And his stated aim, in introducing Molyneux's question, is to occasion his “Reader ... to consider, how much he may be beholding to experience, improvement, and acquired notions, where he thinks, he has not the least use of, or help from them.” So far, however, there is no mention of tactual perception at all. Nor is there in the passage immediately following, in which Locke remarks:

But this is not, I think, usual in any of our Ideas, but those received by Sight: Because Sight, the most comprehensive of all our Senses, conveying to our minds the Ideas of Light and Colours, which are peculiar only to that Sense, and also the far different Ideas of Space, Figure, and Motion, the several varieties whereof change the appearances of its proper Object, viz. Light and Colours, we bring our selves by use, to judge of the one by the other. This, in many cases by a settled habit, in things whereof we have frequent experience, is performed so constantly, and so quick, that we take that for the Perception of our Sensation, which is an Idea formed by our Judgment; so that one, viz. that of Sensation, serves only to excite the other, and is scarce taken notice of itself.

(*II.ix.9*)

This passage, it seems, is intended to explain further how “Judgment” enters into our visual perception of 3D figures, and why it is that this is scarcely noticed. Thus it may be that Locke's discussion of Molyneux's question (and his negative answer to it) is intended to support this account of what is involved in 3D visual perception and explain why it may seem surprising, and not to express any general skepticism about cross-modal transfer; after

all, it is compatible with this account that the MBB could identify, at first viewing, previously felt *two-dimensional* (2D) figures such as circles, triangles, and squares. If so, then although Locke endorses Molyneux's negative answer to the question he poses in the *Essay*, there may be other versions of the question—including some about cross-modal transfer—to which Locke would, or could, answer “yes.” On the other hand, it may be that Locke's endorsement of Molyneux's verdict goes deeper and that he thinks there is no cross-modal transfer between tactual and visual perception of spatial figures at all.

My primary aim in what follows is to distinguish a number of different questions about visual perception that Locke could be asking, all arising from reflection on the scenario described by Molyneux—and to argue that there are some that he could answer with a “yes”, consistent with his other views about perception and concept formation. This requires, of course, that the answers avoid recourse to innate ideas of geometrical figures, or to innate bridge principles linking visual and tactual experiences, or to ideas that appear to be the products of a “common sense.” They must also conform to Locke's views about the ways ideas derived from sense-perception figure in, and can be “altered” by, the mental processes that he counts as allowable “Operations of the Mind.” In addition, as many commentators stress, any answer must respect Locke's view that genuine sense perception is the “passive” reception of ideas.⁴

The question I'll discuss first is the one Locke explicitly sets out to answer, namely, how it is that we can come to recognize or identify 3D figures such as globes by sight, given that what's “imprinted in our Mind” when we look at a globe is an idea of a 2D “flat Circle variously shadow'd.”⁵ An answer to this question will help to answer another, namely, whether globes and other 3D figures can truly be the objects of *visual* perception (given that this requires “passivity”) or are rather, strictly speaking, perceivable solely by touch—so that what we loosely describe as the visual perception of a globe is really the perception of a “flat circle” associated with a particular kind of *tactually* perceivable 3D figure. An answer to that question, in turn, will help us to see whether there are versions of Molyneux's question to which Locke could have answered “yes.”

In discussing these questions, I'll temporarily assume that Locke regards cross-modal transfer in the perception of 2D *spatial figures* to be unproblematic and ask what special problems he takes there to be for the visual recognition of 3D figures such as cubes and globes. Later, however, I'll discuss the further question—which many regard as the one Molyneux *should* have raised—of whether there is any cross-modal transfer, *in the 2D case*, between the deliverances of sight and touch.

Locke's account of the visual identification of 3D figures

Let's assume that the MBB's initial visual contact with a globe would “imprint” in his mind an idea that can be characterized *qualitatively* as “a flat Circle variously shadow'd.”⁶ In addition, if we assume cross-modal transfer in the perception of 2D figures, we can characterize this “imprinted idea” as a mental state—call it a “circle-idea”—that can immediately function in thought in the same distinctive ways as the ideas previously imprinted by touching 2D circular figures.⁷ However, given that Locke answers “no” to Molyneux's question as he presents it, he must hold that the MBB cannot, at least at first sight, acquire a *globe-idea* on his initial viewing of a globe—that is, a mental state that (among other things) immediately produces the belief that there's a globe before him, and the disposition to identify, smoothly and unthinkingly, the object producing the idea as of the same kind as the globes he's previously perceived by touch.

Locke's view, as already noted, is that this can occur only after one gains sufficient familiarity with the differences in appearance produced by 3D figures under various lighting conditions (e.g., that a uniformly colored globe, when viewed under certain conditions will produce qualitatively circular ideas that are shadowed in certain distinctive ways); only then can one identify globes immediately by sight. However, Locke says little about what this experience (or "use") involves; in particular, whether it requires simultaneous tactual perception of globes—or any sort of tactual perception at all. And he finishes his description by claiming that judgment "alters the Appearance [of convex objects] into their Causes." This seems, at best, mysterious: what exactly does Locke think goes into this process; *what* gets "altered" into *what*—and how?

These passages in *Essay* II.ix are hard to make completely consistent, both internally and with the rest of Locke's corpus. However, many commentators argue that the best interpretation of these passages is that, on Locke's view, we can "receive" purely visual ideas of 2D figures such as squares and circles, and tactual ideas of 3D figures such as cubes and globes, but we cannot receive purely visual ideas of 3D figures. Our ability to identify 3D figures by sight depends on experience, and the role of experience is to produce an association of (for example) one's "flat and shadowed" circle-ideas with one's tactually produced idea of a globe, and reinforce it so strongly that, when viewing a globe, one's mind makes an inference from (visual) circle-idea to (tactual) globe-idea so quickly and automatically that the transition is not noticed.

This interpretation has significant virtues. It not only allows us to understand Locke's negative answer to Molyneux's question as affirming that "Judgment", in some way or other, is required for the recognition of 3D figures by sight, but it also—by giving an essential role in this process to tactual perception—explains why Locke introduces Molyneux's question at this point in the discussion.⁸

However, this interpretation does not explain why Locke says that judgment "alters appearances" in such a way that "from that, which truly is variety of shadow or colour, collecting the Figure, it makes it pass for a mark of Figure, and frames to itself the perception of a convex Figure, and an uniform Colour." This passage suggests that it's the "flat and shadowed" idea *itself* that gets altered. Moreover, it's hard to see how the transition from a "flat and shadowed" circle-idea to a tactually produced idea of a globe could deliver the perception of a convex figure of "uniform Colour." In addition, this interpretation seems to conflict with Locke's claim, in other sections, that both vision and touch (directly) produce (simple) ideas of "figure."

There are, however, other ways to interpret these passages. An alternative I'd like to explore is that, after sufficient observation of globes under varying conditions and (implicit) recognition of the similarities and differences in the way they look, an idea qualitatively identical to the one initially "imprinted" (that is, "flat and shadowed" in just the same way) can itself come to function as a *globe-idea*.⁹ That is, after sufficient observation and reflection, the "imprintation" of a "flat shadowed" idea can prompt one to recognize or identify—smoothly, unthinkingly, and directly: without any cognitive intermediaries—the cause of that sensation as a uniformly colored globe (and, for those with sufficient conceptual sophistication, produce a belief that one is looking at a uniformly colored globe). It is in this sense, I suggest, that judgment can "alter" appearances into their causes. And since Molyneux's MBB has not had the experience required for his judgment to effect this alteration, it's clear why Locke answers "no" to the question as he poses it in II.ix.8.

On the view I'm proposing, the "alteration" made by judgment relies upon some sort of conscious association of "flat, shadowed" ideas with something else—presumably with geometrical descriptions of globes and cubes, and thus the ability to identify globes and cubes by

sight *initially* requires some sort of conscious association of ideas. But after the subject learns what globes (and other 3D figures) look like under various conditions, the associative transition need not enter into the perceptual process itself. Globe recognition can thus occur *directly* (via ideas that, though intrinsically “flat and shadowed”, come to function as “globe-ideas”), without any cognitive intermediary.¹⁰

Moreover, not only would the interpretation I've suggested allow a literal reading of Locke's claim that Judgment “alters” visual appearances into their causes, and of Locke's claim that ideas of figure can be produced by both sight and touch, but, as I'll argue later, it promises to shed light on some other puzzling questions that arise for Locke, among them what it is to be a *simple* idea, and how it is that our ideas of primary, but not secondary, qualities can *resemble* the qualities in question.

The plausibility of this picture, of course, requires that such a “transformative” process be compatible with Locke's other views about perception and concept acquisition. It seems, however, that Locke invokes (or should invoke) a similar process in his account of abstraction. Locke's most promising attempt to characterize abstraction is widely regarded to be his description of it (in II.xi.9) as a process, “whereby Ideas taken from particular Beings become general Representatives of all of the same kind; and their Names general Names, applicable to whatever exists conformable to such abstract Ideas.”¹¹ However, he goes on to suggest that “Such precise, naked Appearances in the Mind, without considering, how, whence, or with what others they came there, the Understanding lays up...as the Standards to rank real Existences into sorts as they agree with these patterns.” To which Berkeley, famously, replies that such “naked Appearances” cannot exist, since it is impossible to separate (visible) color from (visible) extension, or extension from shape or size.

Many commentators have come to Locke's rescue by suggesting that Locke has no intention of endorsing such “naked Appearances” as freestanding ideas but is rather claiming that we can take (say) an imprint characterizable as (qualitatively) white, cylindrical, and chalky to represent whiteness by “selectively attending” to one of its distinctive features, its *whiteness*.¹² And, as Berkeley and Hume make clear, the way one considers an appearance alone, and makes it a representative of a kind, is for the subject to use that particular imprint, with all of its qualitative features, to reason about all and only items that share the distinctive feature in question.

To be sure, the process I have described in which the imprint of a (qualitatively) “flat shadowed circle” comes to represent a globe is somewhat different from the process of abstraction that Berkeley and Hume have in mind since it is taken to represent neither flatness, shadow, nor circularity but something entirely different: being a globe. But if one can come to use that imprint in recognizing and reasoning about globes, then it can come to represent globes in just the way that Locke's white cylindrical imprint can come to represent (and thus be an idea *of*) whiteness.¹³ In short, this process can plausibly be viewed as what occurs when judgment “alters appearances” and thus “appearance altering judgment” turns out not to be so mysterious after all.

However, there is another question about the view I've sketched that needs to be addressed, namely how, on this view, Locke would explain how the MBB gets the idea of a “convex figure” in the first place. How, according to an empiricist like Locke, could one get an idea of that third dimension, which figures so heavily in (what I've taken to be) the initial calculations required for “altering” a qualitatively flat, shadowed sensation into a perceptual concept of a 3D globe? If the only way one could acquire this idea is by feeling a globe at the same time one receives a flat shadowed sensation and realizing that *this* (the visual sensation) is a projection of *that* (the touch-derived idea of a globe), then even if the MBB can take his time and view the 3D figures from various perspectives, the answer to Molyneux's question must be “no.”

But there are two other possibilities, compatible with Locke's principles, which permit a positive answer to this version of the question (at least on the assumption, to be discussed later, that the perception of *2D figures* can transfer from touch to sight). One explanation does, and one does not, give an essential role in this process to tactual perception—and I'll discuss the consequences of adopting each.

In sketching the explanation that gives no role to tactual perception, let's consider a sighted person born without the capacity to feel, and ask whether, consistent with Lockean principles, she could acquire an idea of 3D space. Sight, by hypothesis, gives her ideas of 2D figures, e.g., "flat Circle[s] variously shadow'd." And let's assume she has access to textbooks detailing the principles of solid geometry as well. One might think, at first, that Locke must hold that these principles are meaningless to our touch-deprived subject. But Locke might be able to explain how she could get an idea of three-dimensionality by constructing it from her idea of a spatial dimension (gotten, unproblematically, from vision). By hypothesis, she has visual "sensations", and thus ideas, of 2D figures, and can selectively attend to one or another of their dimensions, thereby getting an (abstract) idea of a spatial dimension.¹⁴ Next, she reads her text and learns about the properties of figures with *three* dimensions (in a 3D space), including the properties of their 2D projections onto a plane. She could enhance her understanding of such figures by some analogical reasoning as well, for example, "just as squares extend out from lines in a 2D space, so cubes extend out from squares in a 3D space."¹⁵ This sort of analogical reasoning is not unfamiliar in Locke.¹⁶

On the other hand, Locke may well hold that, without having perceived 3D figures like cubes and globes by touch, one is incapable of having a sufficiently robust idea of three-dimensionality, or "convexity." But there is an explanation of the role of touch in the acquisition of this idea which still permits a positive answer to (the 3D version of) Molyneux's question.

Suppose that one needs to have felt 3D objects to have the right sort of idea of convex objects (or 3D space). Still, one (presumably) could acquire the idea of convexity by touch, and then, after studying one's solid geometry textbook, derive the idea of a 3D object that has a certain sort of projection on a 2D plane. Then—again, assuming that, for 2D figures, experience of the way something feels transfers information about the way that thing looks—one should be able to identify the 3D figures in the Molyneux scenario in the way described above, as long as there's enough time to look at them from various angles. A positive answer doesn't seem to require any simultaneous experience of the items felt and seen.¹⁷ Indeed, the identification of some specific 3D figure (say, a globe) doesn't even seem to require prior tactual experience of that kind of object (globes); in a world without globes one could acquire enough of an idea of three-dimensionality to plug into the generalizations about how globes affect one's visual perceptions by touching *other* convex figures, such as cylinders and cubes.

If this is Locke's view, his endorsement of Molyneux's explanation of the MBB's (conjectured) inability to identify the globe on first viewing, that is, "yet [the MBB] has not yet attained the Experience, that what affects his touch so or so, must affect his sight so or so" can be read as the claim that, though the MBB knows by experience how 3D objects from different angles feel, he has no experience yet of what 3D objects, from various perspectives, look like. But once he realizes that there is a single 3D object that can affect his sight by producing the variously shaded circles he sees by looking at the globe from different angles, he has enough experience for judgment to work on and transform.

On this view, Locke's introduction of Molyneux's question where it appears in the *Essay* would be motivated merely by his desire to remind us that, when typical subjects think about what goes on when they smoothly and routinely identify globes as globes by sight, they fail to realize that an "appearance altering" judgment has occurred. Only when thinking about how things would work for someone like Molyneux's "man born blind" do we recognize the transformations effected by judgment on our visual perceptions of 3D objects. That is, only when we consider the abilities of the MBB do we realize that the class of perceptions (which I've identified with perceptual or recognitional concepts) outruns the class of sensations, in that qualitatively identical (visual) sensations can function, in different circumstances, as perceptions of different things.¹⁸

However, there is a passage in *Essay* II.ix.9, quoted above, that raises questions about this reading, since it suggests that the (flat shadowed) "sensations" involved in visual perception put us in mind (albeit quickly and automatically) of *other* ideas by which we think about and identify 3D figures like cubes and globes—and thus that 3D perception requires inference.¹⁹ In addition, some recent commentators, in response to an interpretation of these passages that is close to the one I've proposed, have challenged the feasibility of understanding Locke to hold that we can directly perceive 3D figures. I will address both worries in the next section.

Can the visual perception of 3D figures be direct?

As I've acknowledged, my suggestion that the "flat shadowed imprint" that is produced in the mind when one views a globe permits direct perception of that globe may seem to be undermined by the passage in *Essay* II.ix.9 quoted above. The problematic part of this passage is Locke's claim that "we take that for the Perception of our Sensation, which is an Idea formed by our Judgment; so that one, viz. that of Sensation, serves only to excite the other, and is scarce taken notice of itself." Here, one might take Locke to be saying not that the flat, shadowed product of "Sensation" has, given the effects of judgment, come to function as a "globe-idea",²⁰ but that visual contact with a globe produces a 2D idea that gives rise to *another idea*—presumably, the idea of a 3D figure of a certain description—which denotes whichever figure matches that description. He may seem to reinforce this later, in II.ix.10, where, after detailing other cases in which ideas are associated by "habit", he maintains that "therefore 'tis not so strange, that our Mind should often change the Idea of its sensation, into that of its Judgment, and make one serve only to excite the other, without our taking notice of it" (II.ix.9).

It seems, however, that these passages can be squared with the view I've attributed to Locke if we take him to be interested in explaining, to those who haven't much considered the question, the nature of the sensory stimuli that (in normal perceivers) prompt our judgments about the presence of 3D figures: We may initially *think* that the "sensations" that prompt cube and globe recognition and yield judgments such as "That's a cube" or "That's a globe" must be 3D themselves, or in other ways radically different from the stimuli that prompt our recognition of and judgments about the presence of 2D items such as circles and squares. But in thinking further about the sorts of ideas that vision by itself can produce—as we're forced to do when considering Molyneux's question—we come to recognize that it could only be a 2D stimulus that is prompting those judgments.

The placement of this discussion immediately after the passage in II.ix.8 in which Locke reports that, according to Molyneux, many "divers ingenious Men" to whom he posed his question initially got the wrong answer, and argues that this shows that (untutored) people have generally incorrect views about how perception works, is evidence that Locke is

interested in correcting misconceptions about visual perception. And Locke's use of the term "excite," in both II.ix.9 and II.ix.10, to describe the relation between sensation and perceptual judgment can be read to suggest that he takes the former to cause (or perhaps reliably indicate), rather than provide inferential support for, the latter. Yet a further consideration is that when Locke notes in II.ix.10 that we frequently blink without noticing that we are "in the dark", he seems to be suggesting that if we think that the "imprints" that prompt our familiar perceptions must be premises in inferences, we will have to say that even our simplest visual perceptions cannot be direct.

However, as I've noted, there are some recent challenges to the claim that Locke holds (or is entitled to hold) that the visual perception of 3D objects is direct—which focus on a proposal by Laura Berchielli that is similar to my own. In her article, "Color, Space and Figure in Locke" (2002), Berchielli argues that while Locke holds that perceivers cannot "receive" ideas of 3D figures by sight alone in the static situation envisioned by Molyneux, there are conditions under which visual experience can produce ideas of 3D figures without need for association with tactual experiences, namely, when perceivers are able to move around the objects and view them from different perspectives, or when the objects themselves are rotated so as to present different faces to a stationary perceiver—and therefore Locke's negative response to Molyneux's question reflects only the conviction that newly sighted perceivers could not identify cubes and globes *at first sight*, and not that they could not do so after viewing them from multiple perspectives.²¹

Moreover, Berchielli argues that vision can produce ideas of 3D figures without any sort of "judgment" or conscious association. On her view, "The process of [3D] figure perception can be divided into two phases. First, 'observing' a series of edges of color. Second, 'considering' how they relate to each other, and synthesizing the different edges into a unique idea of figure" (2002: 58). But, as she stresses, "it is important to realize that this *observing* and *considering* does not involve a judgment" (2002: 56), or any sort of conscious association. As she puts it, "In my model, the material impressions of sight in Locke are not (instantaneous) retinal images, but rather a succession of images" (2002: 58). And thus an idea of figure produced in this way can count as an idea that is passively received, and can thereby be a genuine deliverance of perception.

Berchielli's interpretation has been challenged on a number of grounds. In their "Locke's Answer to Molyneux's Thought Experiment" (2010), Bruno and Mandelbaum agree that since, on Berchielli's interpretation the visual perception of 3D figures requires neither movement on the part of the perceiver,²² nor perception-altering judgment, the visual perception of 3D figures can count as "passive"²³—and thereby it "manages to preserve much of what's important in the empiricist notion that there is a passively received epistemic foundation" (2010: 170).

Nonetheless, they argue, this interpretation should be rejected, since Locke's text makes clear that he thinks that vision is capable of producing only 2D (flat shadowed) ideas of shape, and that the visual recognition of 3D shapes requires "perception-altering judgments" that link these 2D shape ideas with the (3D) deliverances of touch. They also maintain that, given Locke's view that all operations of the mind must be conscious, these judgments must involve an inference or conscious association between these ideas—and this would preclude their being passively received. So, they conclude, we must understand Locke as holding that some perceptions (e.g., all tactual perceptions, 2D visual perceptions) can be wholly passive, while others (e.g., 3D visual perceptions) are at least partially active.²⁴

Now I'm largely sympathetic with Berchielli's interpretation of these passages, and also her contention that the kind of "subpersonal" uptake of information that on her view results in 3D visual perception is not ruled out by Locke's other views.²⁵ However, the interpretation

I've suggested differs from Berchielli's in some crucial ways that may help to escape these objections (and perhaps can thereby "manage ... to preserve much of what's important in the empiricist notion that there is a passively received epistemic foundation"). In particular, I'm happy to agree that the "perception-altering judgments" that transform a circle-idea into a globe-idea can be both active and conscious. My suggestion is that the way judgment "alters" perception is to produce and so strongly reinforce certain conscious associations between flat shadowed ideas and ideas of globes (acquired in some other way) that they drop out of the picture entirely—thus permitting subsequent flat shadowed ideas to count as genuine globe-ideas that are passively received.²⁶

Bruno and Mandelbaum also endorse another objection to Berchielli's account initially presented by Schumacher (2003), namely, that her account does not explain why Locke presents Molyneux's question (in the second edition of the *Essay*) as expressing doubt that the MBB could identify the 3D figures *before he touches them*—rather than before he views them from different perspectives. It seems, however, that if Locke's major concern is to highlight the often ignored intricacies of visual perception, then Molyneux's question serves the same purpose as his own. Moreover, Locke may well hold that if a newly sighted individual were shown a 3D figure from a single perspective, then the only way it could be identified under those circumstances is by touch.

However, Schumacher also argues that "if without relative movement between subject and object it is not possible directly to perceive shapes by sight, but only patterns of colour, why should we see something other than series of changing patterns of colour if there is relative movement?" (2003: 57–58, note 26). This, I believe, is a more serious worry about Berchielli's view—which she may well be able to answer—but a proper answer would require an extensive discussion of what Locke regards as a legitimate "operation of the mind." On the interpretation I've suggested, however, this worry needn't arise, since it allows for there to be—at least initially, before fading out of consciousness—a conscious association between one's flat, shadowed ideas and one's ideas (otherwise acquired) of cubes and globes.²⁷

Clearly, this isn't the only interpretation of these passages.²⁸ But it doesn't seem that there is anything in Locke's view—or the general tenets of empiricism—that would rule out this view of perception. Moreover, this interpretation would have a further payoff in permitting a plausible account of some perplexing passages in the *Essay* in which Locke attempts to characterize our simple (vs. complex) ideas of spatial figures.

Locke on simple and complex ideas of space

Locke is clear that the variety of spatial figures that exist in the world are all "but so many different *simple Modes of Space*" (II.xiii.6; see also II.xiii.4–5). But are our *ideas* of such figures also simple? In some places (e.g., II.v), Locke suggests that our ideas of "Figure", both visual and tactual, are "simple." But in other places—for example, in the II.xiii.6 discussion of the "simple modes of space", which include an "endless variety of Figures"—Locke suggests that our ideas of spatial figures can be analyzed as various repetitions or combinations of the idea of extension, which would make them *complex* ideas. Not only is there a tension here, but it's not clear what exactly Locke takes the simple idea of extension to be.

As Michael Ayers puts it, although sometimes Locke writes as if the simple idea of extension is supposed to be a "general idea" that purports to denote all bodies and regions of space, "he ... preferred [to consider as our simple idea of extended figure] what he called a 'sensible Point', the least portion of Space and Extension, whereof we have a clear and distinct Idea"

(1993: 42). However, Ayers continues, this verdict is unstable, because “sensible points” must have extension, and therefore parts—and thus would count as “complex” as well. Ayers cites evidence to show that Locke “in effect concedes that his paradigms of simple and complex don’t fit extension very neatly” (1993: 42), but concludes that this needn’t make much trouble for Locke, because this concession does not undermine the main purposes for which Locke introduces the distinction, among them that “our power of forming ideas of geometrical figures falling *outside* our experience can be explained as a capacity to build out of what has been given *in* experience...and that we know in “actual sensation” that the ideas of extension which are received correspond systematically to external causes” (1993: 42).²⁹

But if, as Ayers suggests, Locke’s criteria for an idea’s simplicity are (1) its phenomenal simplicity, or as Locke puts it in II.ii.i, its presenting “one uniform Appearance”; (2) its being “given in experience” (or passively received); and (3) its “truth”, that is, its being caused by “real distinguishing characters [of objects], whether they be only constant Effects, or else exact resemblances of something in the things themselves” (*Essay* II.xxxii.14, quoted by Ayers 1993: 40) then why shouldn’t ideas of familiar geometrical figures such as circles and squares themselves count as simple ideas—as Locke indeed often seems to suggest?

Circle and square ideas, after all, seem to be phenomenal simples: although we can recognize that iconically round and square objects (such as CDs and CD cases) are composed of smaller extended regions, we do not naturally “see” them as being so composed but simply as round or square (unlike, say, the logos of the Olympics or McDonalds, which are naturally seen as composed of *five circles*, or *two overlapping arches* and thus seem phenomenally complex). Such ideas also are “passively received” in experience, and they’re effects of “real distinguishing characters” of their causes.³⁰

However, if Locke permits ideas of 2D figures like circles and squares to count as simple, he’d be hard pressed to class ideas of figures like *globes and cubes* as complex, since sighted adults find it just as easy, smooth, automatic, and natural to identify 3D figures such as cubes and globes in perception as to identify 2D figures such as circles and squares: we don’t *see*, nor do we *feel*, cubes and globes to be composed of circles and squares. And, in sighted adults, it *seems* that ideas of cubes and globes are just as “passively received” or “given in experience” as circles and squares.

As for “truth”, it seems clear that Molyneux’s MBB may indeed at first tend to mistake globes for circles, or cubes for squares. But once he gets used to perceiving the world by sight, the ideas of cubes and globes produced by visual perception can be as real a mark of the “distinguishing (spatial) characters” of objects as any of the standard examples of simple ideas given by Locke. However, we can affirm that these 3D ideas are “simple” only if they can function as perceptual concepts that effect the direct recognition of cubes and globes.³¹ A further benefit, thus, of my interpretation of what goes on when Judgment “alters Appearances” is that it permits ideas that are qualitatively characterizable as “flat shadowed figures” to function in just this way.³²

At the beginning of the discussion of whether Molyneux’s MBB could recognize cube and globes on first sight, I helped myself to the assumption that there could be cross-modal transfer in the perception of 2D figures. It is now time to discharge—or question—this assumption.

The 2D Molyneux question

As I’ve argued, it may be that if Locke has the resources to answer “yes” in the 2D case, he could use the materials suggested in the previous sections to answer “yes” in at least some versions of the 3D case. But is there reason to think that Locke would answer “yes” in the 2D

case, given he holds that ideas of 2D figures deriving from touch and sight are phenomenally different and that they are not associated by any innate bridge principles? Locke, unlike Berkeley, takes there to be a single, common space to which both vision and touch provide access.³³ But it's nonetheless possible that the way spatial figures feel is so different from the way they look that it requires experience of the association to make the connection.

Now some philosophers have argued that Locke *must* answer “yes” to the 2D Molyneux question if he wants to maintain that ideas of primary qualities (which include ideas of spatial figure) *resemble* the primary qualities themselves. Given the transitivity of “resembles” (at least when items resemble one another in the same respect), visual and tactual ideas of spatial figures must resemble each other.³⁴ But, as others (e.g., Hopkins 2005; Vaughan 2018) have argued, even if visual and tactual ideas of 2D figures resemble one another in the same respect, it doesn't follow that a newly sighted person would be able to identify those figures at first sight because the phenomenal differences between their tactual and visual ideas may hinder the *recognition* of the resemblance.³⁵ If this argument is correct, as seems plausible, then there may be no firm answer to the 2D Molyneux question—or at least the question of whether the recognition would occur “at first sight”—that is mandated by Locke's other views.

There is, however, a way of thinking about our ideas of 2D spatial figures that would support a positive answer to at least one version of the 2D Molyneux question, and, in addition, help to explicate Locke's claim that our ideas of spatial qualities resemble the properties they denote. The thought is that once we obtain ideas of spatial figures such as a circle and a square, and obtain an objective description of the figures that typically produce them, we find it appropriate, non-arbitrary, or intelligible that these ideas are caused, respectively, by those figures—but not vice versa.³⁶ In contrast, not even the fullest objective description of properties such as red or soft or sweet and their (non-experiential) effects on our sensory systems makes it difficult to imagine that they could have produced ideas in us that are radically different from the ones they in fact produce.

This view does not contend that we can determine the way a square or circle will look (or feel) from an objective description of it, or that we can determine *a priori* the objective properties of circles and squares from the ideas they produce—and thus there is still a gap between these properties and our ideas of them. But there is nonetheless a seeming connection of *appropriateness or intelligibility* between these properties and the ideas they produce, both tactual and visual, that does not exist for properties such as color, taste or smell.

If this is so, then there is a 2D version of Molyneux's question to which Locke should be willing to answer “yes”, even if he believes there are enough phenomenal differences between visual and tactual ideas of the same property to make it impossible to identify circles and squares at first sight. This is the question discussed by Leibniz, namely, whether Molyneux's MBB would be able to identify the spatial figures at first sight if he were *told in advance* which figures would be presented. If the MBB is given the information that the figures in question are a circle and a square, and if the relation between 2D spatial properties and the ideas they produce is appropriate or intelligible in the way I've suggested, then we could expect him to be able to determine, at least after some reflection, which figure is which, even if there is no immediately discernable phenomenal similarity between the tactual and visual ideas of circles and squares.³⁷

This view, moreover, has implications that go beyond the question of what we can expect the MBB to do in the Molyneux situation, since it can be used as a general gloss of what Locke means by an idea's resembling the quality it is an idea of.³⁸ That is, we can interpret Locke's claim that *primary quality ideas resemble primary qualities* as the claim that, after we learn the corpuscular, “real essential” description of the primary qualities of observable things, it

doesn't seem surprising that we *experience* their primary qualities the way we do (that is, it's not surprising that *that* is what it's like to perceive shapes, sizes and numbers).³⁹ Yet for secondary qualities, the question seems (more) open: color or softness or sweetness (described in terms of their corpuscular structure) could have looked, felt, or tasted very different.

Now, one might think that there is a more plausible account of what it is for ideas of primary qualities to resemble those qualities themselves, namely, that the intentional object of a primary quality idea (e.g., *closed plane figure with four equal sides*—or maybe just *thing with shape, size, solidity*)—exists in the world outside the perceiver, whereas the intentional object of a secondary quality idea (e.g., *uniform surface feature of objects that varies along a certain intensive (color) dimension*) does not. This view, too, makes resemblance a non-mysterious notion that avoids Berkeley's complaints. In addition, it doesn't mandate an answer—positive or negative—to Molyneux's question, since it's possible for tactually and visually derived ideas of globes, or circles, to be (or *not* to be) so unlike qualitatively that they prevent the subject from recognizing that they have the same intentional objects.

But this view stumbles in the case of (what one might call) pure recognitional concepts (and which Ayers, writing about Locke's account of simple ideas, calls the thesis of ideas as "bare effects"). These are concepts (ideas) that can be characterized (at least when they're thought of as picking out *qualities* and not just objects that have those qualities) solely as ineffable entities giving rise to dispositions to classify objects as "that again", or "another one of those."⁴⁰ In cases like these, there's no available discursive characterization of the intentional content of the idea that can be seen to apply—or not—to the world as objectively described. One can't compare idea and quality by taking the description of what the idea purports to represent (e.g., *closed plane figure with four equal sides*) and asking whether the cause of the idea fits that description.⁴¹ One *can* ask, however, whether a subject would find it (in the relevant way) unsurprising or intelligible that the figure in question appears to perceivers *like that* (pointing in, to the qualitative character of the experience in question).

This account of resemblance may seem plausible when applied to number and motion, other Lockean candidates for primary qualities, but what about *solidity*: does a (corpuscularian) characterization of solid objects make it seem intelligible that they appear solid in whatever way they do? As many commentators have noted, Locke is maddeningly vague when he attempts to characterize the idea of solidity. He writes,

The *Idea* of *Solidity* we receive by our Touch; and it arises from the resistance we find in Body ... That which hinders the approach of two Bodies, when they are moving one toward another, I call *Solidity* ... but if anyone think it better to call it *Impenetrability*, he has my Consent. Only I have thought the term *Solidity*, the more proper to express this *Idea*, not only because of its vulgar use in that Sense; but also, because it carries something more of positive in it, than *Impenetrability*, which is negative, and is, perhaps, more a consequence of *Solidity*, than *Solidity* itself.

(II.iv.1)

Locke is trying here to characterize a "positive", non-dispositional quality of objects but ends up sending a questioner "to his Senses to inform him."⁴² What's going on, it seems, is that Locke's corpuscular theory, which mandates a fundamental distinction between body and space, commits him to the existence of an *idea* of something intrinsic to body, which differentiates bodies (whether rocks or water) from space. This is the property *solidity*, and Locke is trying to direct our attention to an idea produced indifferently by the great variety of space occupiers, or (what he calls) solid things.

Whether or not there is such an idea (and whether, if so, it's touch rather than vision that affords it) is a good question. But Locke, in assuring his readers that if they attend closely to the ideas produced by flints and footballs (and recognize their difference from the idea of "Hardness" [II.iv.4]), they'll "know it (the idea of solidity) when they see", reveals that he thinks that there *must be* an idea that has an intelligible connection to the corpuscular description of solid objects. So, if there *is* an idea of solidity available through touch, it will resemble the quality it represents in the way I've described.

There are reciprocal questions, however, about whether this account of resemblance gives the proper verdict about ideas of secondary qualities, which are *not* supposed to resemble the qualities they represent. Take color, for example: suppose we know the corpuscular surface features (or the effects on our brain and visual system) of objects that look red and yellow and that we're familiar with the way that red and yellow objects look (under standard conditions). One might think that we'd find it unsurprising or intelligible that an object with certain similar corpuscular surface features (or neural effects) looks orange (under standard conditions). Indeed, one might think we'd even be able to *predict*, on the basis of information about its surface features (or neural effects), what color an object would appear to have (under standard conditions); consider, for example, Hume's missing shade of blue.

There's an important difference, however, between this case and the perception of spatial figures. Presumably, if we were to have complete knowledge of the surface corpuscular features of red things but had never before seen any colors, we'd find it surprising that those things looked like *that* (i.e. red).⁴³ Even after reflecting on the idea along with our conception of its surface corpuscular cause (or neural effects), we'd be willing to concede that there's no intuitive connection between the (colored) way that thing looks and these features (and it's easy to imagine once one becomes familiar with other colors, that those very same surface features could have looked to have one of those other colors instead).

Only after we've seen a number of colors, and been informed about the surface properties (or neural effects) of the objects with those colors, can we extrapolate to the colors that objects with related surface properties would look to have. And the information that guides this extrapolation is purely relational: if things with these surface properties look like this (red), and things with those surface properties look like that (yellow), then an object with surface properties "between" those of red and yellow objects will look to be a color that's between the ones the red and yellow objects look to have (orange).

Finally, one might worry that there are other cases of what Locke would categorize as secondary qualities that "resemble" their causes in the way I've described. Take *heat*, for example. If it's not surprising that corpuscles arranged in a solid, cube-like mass should look (or feel) like *that*, then it may not be surprising that furiously moving corpuscles should feel like (ouch!) *this*. But such a result can be taken to raise questions for Locke's classification of qualities as much as for this account of resemblance. That is, we could take it to suggest that, instead of there being a secondary quality that resembles our touch-derived idea of it, heat (or more broadly, temperature) is a primary quality of objects, too.⁴⁴

Conclusion

Locke's discussion of Molyneux's question is often treated as a forerunner of Berkeley's, with its emphasis on whether tactual perception of spatial figures provides information that can be used to recognize those figures by sight alone. Other philosophers take its primary interest to

be in the break it exhibits between Locke's conception of ideas and that of his predecessors. Still others take its contribution to Locke's views to be unimportant, since it was, after all, inserted into an already-written chapter that Molyneux took to support his own negative answer to the question.

As I made clear at the outset, I can't argue that my suggestions about how Locke could have answered Molyneux's question have uncontested support from the relevant texts. But I hope I have shown that they are consistent with most of Locke's corpus and the general tenets of empiricism. And, more important, I hope I have shown how they can be used to make sense of—or at least open up further fruitful discussion of—other difficult and contested passages in the *Essay*.

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Notes

- 1 For example, Evans (1985), Campbell (1996), Loar (1996), Ludwig (1996), Prinz (2002), Meltzoff (1993), Hopkins (2005), Glenney (2013a, 2013b), Matthen (2012), and Levin (2008). At least some of these philosophers, however, discuss Molyneux's question in the context of Berkeley's answer to it.
- 2 Berchielli suggests that the fact that Locke added his discussion of the question, in the second edition of the *Essay*, to these passages in II.ix supports this contention.
- 3 Locke uses the term "perception" to designate anything that goes on in the mind when one "sees, hears, feels, etc. or thinks", but he's particularly interested in discussing the nature of the "ideas" produced by *sense*-perception. This is my concern as well.
- 4 Indeed, another aim of this discussion is to explore what "passivity" requires—and which sorts of "ideas" can, for Locke, qualify as being passively received.
- 5 One might ask further whether there can be visual perceptions, strictly speaking, even of "flat circles" or whether we just have visual perceptions of "Light and Brightness coming to our Eyes." This interpretation is endorsed by Bolton (1994) but requires a nonliteral reading of the passages in question. (See Vaughan 2018 for discussion.) Nonetheless, I'll understand Locke, for now, as holding that we *can* have "ideas" of flat circles, and ask how we get from them to ideas of 3D globes.
- 6 This is not universally accepted; see previous note. In addition, we don't have to think of ideas as mental particulars like sense-data but can think of them as (instances of) mental states (modes of consciousness) that have certain qualitative properties.
- 7 For example, to produce the belief that there's a circle before one, or prompt one to identify the object producing the idea as of the same kind as a figure perceived by touch. It may also be that the idea functions to produce other beliefs or behavior appropriate to circles, but I'm concentrating on the idea's role in classification or identification (recognition) for now.
- 8 See Vaughan (2018) for an argument that this is an important constraint on the interpretation of these passages.
- 9 In addition, similar, but qualitatively distinct, "imprinted ideas" that one may acquire in looking at the globe from different angles will also prompt one to classify or identify what she's seeing as a 3D globe. In having these qualitatively different ideas, under these circumstances, she'll be having ideas that represent the same (kind of) thing, a 3D "convex figure", a globe, and, if veridical, refer to 3D globes.
- 10 It may seem anachronistic to read Locke as making such a claim. However, that Locke allowed such initial calculations to produce cognitive connections without being explicitly displayed gets support (albeit in a different context) from his discussion of habitual knowledge in *Essay* (IV.i.9). Here Locke discusses the status of "such Truths, whereof the Mind having been convinced, it retains the Memory of the Conviction, without the Proofs." A truth of this sort, he affirms (though he confesses to have doubted it for a while), "comes not short of perfect certainty, and is in effect true Knowledge."

- In his article "Locke and the Objects of Perception," G. A. J. Rogers cites Locke's II.ii.2 remark that, just as we cannot create or destroy atoms of matter, a thinker is unable to "fashion in his Understanding any simple *Idea*, not received by his Senses, from external Objects, or by reflection from the Operations of his own mind about them" (2004: 248), and concludes that Locke holds that "the atoms of our understanding—the phenomenal atoms of experience—are as fixed as the atoms of the natural world" (2004: 249). This may suggest that Locke could not permit the activities of judgment to be "transformative" in the way I have sketched. On my view, however (no doubt contrary to certain contemporary representationalists) mental state with the same phenomenal character can, in different contexts, represent different things.
- 11 This is in contrast to his remarks in other places in the *Essay* (e.g., III.iii.7, IV.vii.9).
 - 12 As Locke himself puts it, immediately after the "naked Appearance" passage: "Thus the same Colour being observed to day in Chalk, or Snow, which the Mind yesterday received from Milk, it considers that Appearance alone, makes it a representative of all of that kind; and having given it the name *Whiteness*, it by that sound signifies the same quality wheresoever to be imagin'd or met with."
 - 13 Indeed, while a "white, cylindrical" imprint can be used equally well to represent cylindricity and whiteness, once one's "flat shadowed" imprint comes to represent globes, it is almost impossible to "go back"; this, no doubt, is why *trompe l'oeil* paintings are so convincing (and the argument from illusion a difficult sell).
 - 14 This assumes that, for Locke, the process of abstraction can be explicated as a (more or less Berkeleyan) process of selective attention to (phenomenally distinctive) features of determinate ideas. See (among many others) Mackie (1976: 110).
 - 15 Some suggest that it may be very much like the situation described in *Flatland*. (In both this case and the following, we may also have to assume that the subject is aware that nothing exactly like what's described in the geometry texts exists in the world or can be perceived; still the general principles of projection will survive these approximations.)
 - 16 For example, it's in just this way that he attempts to get us to think about the primary qualities of "insensible" corpuscles (II.viii.9). See also *Essay* (IV.xvi.12), in which Locke stresses the importance (and gives more examples) of the use of analogy in scientific reasoning.
 - 17 Or any information suggesting that what one is seeing would feel a certain way (i.e. like a globe).
 - 18 It's this sort of shift in function, presumably, that occurs (on the "selective attention" view) in abstraction as well. I'll discuss this further at the end of the next section.
 - 19 If this is Locke's view, he could still answer "yes" to the question of whether the MBB could recognize the globe by sight alone before he's touched it (once again, on the assumption that there's cross-modal transfer between tactual and visual 2D figures). He could determine which object is the globe by linking his 2D "sensation", via principles of projection, with a further distinct idea of the 3D figure that would produce that sensation. To be sure, the idea of a 3D "convex" figure, the globe, must be derived either by touch or by vision and analogical reasoning. But the resources for deriving this idea, as I've argued, are available to the MBB before he's actually touched the objects that he sees. On the other hand, the answer to my second question—whether globes and other 3D figures can be the direct objects of *visual* perception—would have to be "no." We *think* that vision can put us in direct perceptual contact with cubes, globes, and other 3D objects—or at least contact *as* direct as in perception of 2D figures—but it does so only indirectly, by producing in our minds an associated idea either derived from tactual perception, or constructed from vision-produced ideas by abstraction. On this view, visual perception of 3D figures would at best be less direct than perception of 2D figures—and at worst, if ideas of 3D figures are derivable only by touch, impossible.
 - 20 That is, when "receiving" the sensation, the subject will be disposed to exhibit globe-appropriate behavior, such as reaching out toward, or preparing to catch, objects in certain distinctive ways, and to classify the object as similar to other globes—and, if the perception is veridical, to denote a globe.
 - 21 As she puts it, "in situations in which one has several points of view on an object, I believe Locke considers it possible to receive the idea of a 3D shape" (Berchielli 2002: 64).
 - 22 On her view, after all, object rotation in front of a stationary subject will suffice to present a sequence of retinal imprints.
 - 23 "A perceptual process counts as increasingly active to the extent that it requires perception-altering judgments or complex movements generated by the perceiver, e.g., when it requires subtle tactile grasping or coordinated eye and head movement, in order to perceive different kinds of ideas" (Bruno and Mandelbaum 2010: 170).

- 24 They conclude: “The interpretation defended here allows that three-dimensional geometric figures must be actively visually perceived because the perception requires some perception-altering judgments. Although one can passively perceive three-dimensional objects through touch, one could not transfer the tactile idea of (e.g.) cube to the visual because the visual idea of cube requires active judgments. These judgments would require some prior cross-modal experience and training” (Bruno and Mandelbaum 2010: 173).
- 25 However, I think it’s an open question whether there’s a difference between a subject’s moving around an object to get different views and having an object rotated in front of a stationary subject. See my “Molyneux’s Question and the Amodality of Spatial Experience” (Levin 2017) for further discussion.
- 26 Again, if this view seems anachronistic, see *Essay* (IV.i.9). See also the debate between Copenhaver and Van Cleve (Copenhaver 2016) about a similar question that arises in interpreting Reid.
- 27 Still, there’s a question here worth pursuing. It seems that if subjects have a lot of background knowledge about how 2D projections of 3D objects change when the object is moved, they may be able to tell that the sequence of colored surfaces that they are seeing is likely to be a globe—which could produce a positive answer to Molyneux’s question. But then the ability to recognize globes in this situation can be pulled apart from the ability to see the 3D figure *as* a globe. See Levin (2017) for further discussion.
- 28 There is some support for it, however, in II.xiii.2–5, where Locke suggests that both sight and touch afford an “infinite variety” (§5) of ideas of figure. Some of what Locke says here may seem to conflict with the view of simple ideas that I attribute to him later in this section, but see note 31 for an attempt to resolve the conflict.
- 29 Chappell too (1994: 36) argues that there is tension in Locke’s views about what counts as a simple idea, but that “this is not a fatal difficulty for Locke, whose main purpose in marking off simple ideas is to bolster ... the doctrine that “‘all the materials of Reason and Knowledge’ are ultimately provided by experience [as in II.i.i].” There may be a further problem, however, given that Locke takes ideas of spatial figures to be obtainable by both sight and touch, in taking the “least portion” explanation of simple idea, since this will undoubtedly be different for sight and touch.
- 30 It is true that Locke claims (in III.iv.4,7) that the names of simple ideas are undefinable. If so, this would preclude the existence of any simple ideas of space, and provide more evidence for the contention that notions of simplicity and complexity do not comfortably apply to spatial ideas. However, if the names of simple ideas must be undefinable, then a variety of nonspatial simple ideas, for example *darkness*, *coldness*, and *softness*, would also be suspect, since they can be defined (as various sorts of “absences”) as well. In any case, Locke’s undefinability thesis has other problems: After all, *square* can be defined as a plane rectangular figure bounded by four equal lines, *line* can be defined as a terminal edge of a rectangular figure (perhaps extended indefinitely in either direction) and of course *sensible point* (as Ayers points out) can be defined as “the least portion of Space and Extension, whereof we have a clear and distinct Idea.” Moreover, Locke’s warnings, in II.viii.1–6, against taking simple ideas like *black*, *darkness*, and *rest* to be “negative” because they can be characterized as, respectively, the absence of color, light, and motion suggests that he would permit ideas to be simple even though their names can be defined.
- 31 One might wonder what the limits are on our (vision-derived) simple ideas of space: can we have a simple (visual) idea of *any* spatial figure? On the view I’m sketching, the answer is “no”, but the limits on our ideas of spatial figures are to be determined empirically, by looking at which spatial figures we can develop dispositions to recognize or identify in visual perception.
- 32 M. B. Bolton also worries about whether, for Locke, ideas of spatial figures can be simple. She writes: “Further, it is clear visual ideas of figures must have a certain complexity. They are not just visual images, but also marks of the shapes of things. The visual idea of a cube is a light-colour pattern plus the understanding that it is caused by a cube, which can only be represented by a second, tactual idea. The content of visual ideas of figures must involve at least two separable elements. Perhaps it should not surprise us that some of Locke’s *simple* ideas have logical structure, for we saw that these ideas are not conceptual atoms and, moreover, that all simple ideas serve as marks of the qualities of their causes. This sort of complexity is not inconsistent with Locke’s essentially undefined notion of simple idea, but it does illustrate its latitude” (1994: 98–99). Bolton, unlike many commentators (and also myself) takes Locke as denying that we have visual ideas of figure, even 2D, at all. Still, the account of a cube-idea like the one I suggest in the text could be used to ease tensions in Bolton’s interpretation of Locke as well: if all the information about “causes” is taken to be working behind the scenes, rather than appearing in the content of one’s ideas, then certain “light-colour pattern[s]” can be taken to be simple

- ideas of cubes as long as they function in thought, and especially, recognition and perceptual classification, in the relevant way.
- 33 As he puts it, “we can receive and convey into our Minds the *Ideas* of the Extension, Figure, Motion, and Rest of Bodies, both by seeing and feeling” (II.v; also see II.xiii.2, 5).
 - 34 See Mackie (1976: 32) and Ayers (1991: 65). Of course, resemblance *simpliciter* isn't transitive.
 - 35 Vaughan (2018: 10), calls this the “sight-recognition error: the assumption that seeing entails recognizing what one sees.” Hopkins (2005: 453) suggests that the error arises from conflating the possession and application conditions for concepts. See also Matthen (2011) for an interesting variation of this worry.
 - 36 Borrowing from Berkeley (1965: §142), we can say that our spatial ideas, both visual and tactual, seem to be particularly “fit” signs of the figures they denote. See *Essay* IV.iii.13 for evidence that these questions of relative intelligibility were very much of interest to Locke. See also Rozemond and Yaffe (2004: §2) for a convincing argument that, for Locke, the characteristic relation between *explanans* and *explanandum* in mechanistic explanation, in general, is a relation of “intelligibility” weaker than deductive entailment. They argue further for an argument that this sort of intelligibility features only in explanations invoking primary qualities.
 - 37 He could reflect: “I know that *one*” of these figures is a square, and given the differences in the way the figures arrayed before me look (which of course I couldn't have predicted until I actually saw them), it makes most sense that it's *that* one! This view is compatible with Locke's contention, in II. ix.8, that the man born blind would not be able to determine which figure is the cube by noting its protuberant angles, since my suggestion is intended to apply to 2D figures. As discussed above, Locke takes there to be special difficulties for the (immediate) identification of 3D figures by sight. Presumably, the man born blind would need to have touched squares and circles to be able to form the requisite geometric-corpuscularian conceptions of them, but the “appropriateness” relation in question holds between the visual ideas and those conceptions themselves.
 - 38 As Berkeley (famously) put it, “an idea can be like nothing but an idea” (1982: §8).
 - 39 Or perhaps that it's hard to *imagine* that these properties could look or feel different than they do (under normal conditions).
 - 40 We need to specify a disposition in addition to a qualitatively characterized idea to specify (or specify at least partially, if one has Wittgensteinian concerns) *which* quality is being picked out.
 - 41 To be sure, there are other ways of understanding the resemblance relation, which may avoid this difficulty, and also avoid the (to be sure difficult to interpret) claim that resemblance holds between (physical) properties of objects and qualitative or phenomenal properties of ideas. (For example, see McCann 2011). But it's of interest that Locke does have the resources to rebut Berkeley's charge.
 - 42 “Let him put a Flint, or a Foot-ball between his Hands; and then endeavor to join them, and he will know” (II.iv.6).
 - 43 Or so many say, e.g., Jackson (1982).
 - 44 To be sure, temperature is not a quality that single corpuscles can have “by themselves”, as Locke's official definition of a primary quality (II.viii.9) requires, since temperature is identified with a group of corpuscles in relative motion. But, in a somewhat looser sense, heat, like *texture* (ii.viii.10), can be regarded as primary, in the sense of belonging intrinsically to *aggregations* of corpuscles with the PQs [primary qualities] (strictly construed) of size, shape, solidity, motion, and number. That is, if texture can be primary by being an intrinsic property of aggregations of corpuscles, then temperature can also be primary, since the constituents of every aggregation of corpuscles (of sufficient size) will be in some or other degree of relative motion—and thus the aggregation will have some or other degree of temperature. What makes it seem as though temperature *must* be secondary is the conflation of temperature with *feelings* of heat and cold. But if temperature is regarded as a property of corpuscles in motion, then it makes sense to regard it as primary (at least in the looser sense) as well. Indeed, Locke could treat any tendency to regard an alleged secondary quality as resembling its cause, in the manner sketched above, as evidence that there's some conflation occurring between a property of the object and a qualitative feature of the sensation produced by objects with that property.

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11

BERKELEY'S ACCOUNT OF EXTENSION AND ITS PLACE IN VISION SCIENCE

Robert Schwartz

The goal of this paper is to examine, clarify, and explain Berkeley's notions of visual and tangible extension. When so understood, I believe many of Berkeley's puzzling claims make good sense, are empirically less problematic than assumed, and are immune to many of the criticisms commonly taken to undermine his theory of vision. I also believe that my analysis of Berkeley's position will enable us to better appreciate the influence his ideas have and continue to have on the treatment of a number of classic problems in the history and philosophy of the visual sciences.

The key to unraveling these matters lies in Berkeley's analysis of the relationship between visual and tangible extension and his claim that the two extensions are not only distinct, but have nothing in common.¹ According to Berkeley, there are no resemblance relations or necessary connections between the two kinds of extension. This latter claim, Berkeley's doctrine of the heterogeneity of the senses, is perhaps the most contested feature of his theory of vision, and it remains contested in philosophical and psychological studies of perception. A major difficulty resolving this and other controversies over Berkeley's account of perception, however, is the lack of agreement among both his critics and supporters about how best to make sense of his idea of visual extension.²

Some argue that there is no way to understand his notion of visual extension other than as physically extended, thus undermining his heterogeneity doctrine. Others, who find fault with Berkeley's distinction between the two extensions, argue that either his position collapses under its own weight, or when rendered coherent, is inconsistent with epistemic or metaphysical positions he adopts elsewhere in his philosophy. Still others believe they can make sense of Berkeley's idea of visual extension in ways consistent with the rest of his theory, but go on to saddle him with the problematic claim that the visual field is initially unstructured.³

Sensory orders

Before turning to Berkeley's account of extension, for expository purposes I think it helpful to provide a brief summary of more contemporary methods and terminology typically employed in constructing maps of sensory qualities. The first step in such projects is to specify an empirical relation that is to be used in generating the data needed to construct the order. Most often, judgments of phenomenal matching or just noticeable difference are employed

for this purpose.⁴ Given such data, it is possible to construct a map that captures relationships among the elements in the order.

Consider, for example, the mapping of color. It appears in texts as a color sphere, having axes representing hue, saturation, and brightness. Accordingly, the color map is said to be “three-dimensional.” Although the phenomenal appearance of a color can be analyzed along these three axes, the elements of the order itself are each of the discriminable colors. By definition, two colors are “next” to one another in the color order, if and only if, no color comes between them in that order. Color likeness is measured in terms of the distance between colors on the map, i.e. the number of colors that separate them in the order. This same method may be employed to construct other sensory orders. For example, judgments of matching or just noticeable difference can generate data for ordering phenomenal sounds. Although sounds combine to make chords, the elements of these orderings are typically the “basic” sounds. In many mappings of sound, it is a two-dimensional order, with axes of timbre and pitch. If loudness is added, it is three-dimensional. Either way, similarity of sounds is measured in terms the number of elementary sounds lying between them in the order.

Since no color matches are just noticeably different from any sound, no color occurs in a phenomenal ordering of sound, and no sound occurs in a phenomenal ordering of color. Although likenesses in both domains are measured in terms of the distance between elements in the order, the distances so specified are not common to either sensory space. The units of measure in the former are minimally discriminable colors and in the latter minimally discriminable sounds. The units are incommensurable. It makes no sense to sum distances between colors in a color order with distances between sounds in a sound order, or to locate a color between two sounds in a common phenomenal order and vice versa. The sensory qualities being ordered are heterogeneous. Of course, the physical source of a phenomenal color or sound experience can be assigned to a location in a common physical space, but physical spatial location is not a qualitative property or dimension along which experiences of either color or sound are themselves ordered. Clearly in these examples, the ideas of “nextness” and “distance” in color “space” and sound “space” orderings are not to be understood as measures between locations in physical space.

Visual experience, however, not only has color, but colors can appear at different *phenomenal* places in the visual field. Two colors can be experienced next to one another or some distance away in the visual field. Although any given experience of a color is always experienced at a place in the visual field, visual color and visual place orderings are entirely distinct. At different times, every visual place may be experienced with any color, and on some occasions, all places in the visual field may have the same color. Visual-field location itself, though, is simply not a property found in an ordering of phenomenal color and vice versa. No axis in the color sphere reflects physical or phenomenal spatial relations among the colors ordered. Likewise, in an ordering of visual-field places, there is no axis representing color. On the other hand, our experiences of tangible space do have a place order, but color is simply not a quality of this sense realm.

Sight and touch are usually assumed to be the only sense experiences that have extensions. In the context of such orderings, places in visual extension are not locations in tangible/physical space and vice versa. The orderings of visual extension and tangible extension are each relationally derived structures. They map the relationships among elements in their distinct realms. No place in visual extension matches or is just noticeably different from any place in our experience of physical extension. There is no common space in which both visual and tangible places can be located.

For example, to claim that two physical objects are four paces apart is to assign a physical distance between them, and to say they abut one another is to say they touch at a place in physical space. By contrast, to say that two visual-field places are a distance apart or next to one another is not to assign them any locations or place relations in physical space. We see, for instance, a nearby tree against the background of a distant mountain and perceive their physical locations to be far apart, i.e. we perceive there to be physical places between them. On the other hand, we experience no places in the visual field *itself* separating the phenomenal tree from that of the phenomenal mountain. The places where the phenomenal tree abuts the phenomenal mountain are next to one another in a mapping of the visual field. It is also the case that if we tilt our head the location and places of colors in the visual field change, but there still are no places between the represented tree and mountain at their visually experienced borders.⁵

Berkeley's sensory orderings

I think much can be gained in attempting to understand Berkeley's account of visual and tangible extension by paying attention to his often overlooked, path-breaking account of sensory orders. Although the particular methods and terms used in contemporary constructions of these orders are not those of Berkeley, the underlying ideas are basically the same. Berkeley, of course, does not feel any need to argue that the phenomenal experiences of vision and audition, for example, are heterogeneous. This just seems to be common sense. Although visual and sound experiences may both be perceived as coming from a place in physical space, sounds themselves have no phenomenal places. Place is not a qualitative dimension along which phenomenal sounds are ordered. Like practically everyone else, Berkeley assumes that only vision and touch experiences have extensions. Unlike everybody else, Berkeley claims that visual and tangible place are heterogeneous. This central thesis of his theory of vision has not only been debated, it was and still is taken by many to be patently false. Berkeley argues that those who believe sight and touch are homogeneous are misled because they conflate places in an ordering of physical space with the presence or absence of places in sensory orderings. Sound, smell, and taste experiences themselves have no inherent place orderings, for they have no extensions. Only sight and touch have extensions, and the place orderings of visual and tangible experience are simply not the same.

For Berkeley, visual extension can be explained as constituted of visual *places*, and minimum visibilia (MV) are the phenomenal elements that compose it. By definition, minima are atomic; they have no other minima places as parts. Hence, if having extension is to have parts, minima have no extension. It takes at least two minima to have parts. Berkeley proposes using a single MV, though, as the unit of measure for assessing the distance between places in visual extension. As such, each MV has a size of one. MV are said to be next to one another in the visual field, if there are no MV between them. Locations and distances in visual extension have no significance other than with respect to this phenomenal ordering of MV places. While MV are always experienced as colored, extension is not a property or dimension along which phenomenal colors per se are ordered, and color is not a dimension along which visual place locations are ordered.⁶

Although Berkeley's account is much less detailed, his description of tangible extension accords with the one he spells out for visual extension.⁷ Minimum tangibilia (MT) are the atomic elements in a place ordering of tangible space, and distances in tangible extension are to be measured in terms of the number of MT that lie between two places in that phenomenal order. MV neither resemble nor have any necessary connection to MT. Visual and

tangible places are qualitatively different, and they are not locatable in a common space. Vision and touch experiences can each be ordered for place within their separate domains, but assigning MV places in visual extension is not to locate them in tangible extension. It makes no sense to assign MV locations in tangible space, as it makes no sense to assign MT locations in visual extension. There is no such thing as a distance between MV and MT. The idea of adding the distance between two MV to the distance between two MT is otiose. The units of measure, MV and MT, are incommensurable. The “total” of the two is not a usable measure (*pace* Wilson 1999: 267): “Let anyone try in his thoughts to add a visible line or surface to a tangible line or surface as to conceive them making one continued sum or whole. He that can do this may think them homogeneous; but he that cannot must ... think them heterogeneous” (*New Theory of Vision [NTV]*, Berkeley 1948–1957: I, 13).

Although all MV are experienced as colored, and when they are experienced appear at a given place in visual extension, the phenomenal locations of MV in visual extension have no inherent tangible significance. Location in tangible space is no more a property or dimension of a visual place order than it is of a color or sound order. Experiences of vision and touch are heterogeneous. Visual-field places gain tangible significance only after correlations between sight and touch are established.

For Berkeley, although the colors that appear at a given visual place will change over time, the place ordering of visual extension itself is constant, and it remains unchanged after sight and touch are correlated. What is different is that after they are coordinated, it becomes possible to assign experiences of color, as they occur in varying visual-field places, to locations in tangible space. The same holds for the orderings of other sense modalities. For example, sound and smell do not have phenomenal extension and therefore have no axes representing qualitative places in their sensory realms. Sound and smell experiences can acquire spatial significance only after we learn their correlations with touch. Nevertheless, while it then becomes possible to assign experiences in these phenomenal realms to places in physical space, these sound and smell experiences do not themselves have extensions.

In *Theory of Vision Vindicated (TVV)*, Berkeley says, “The proper immediate object of vision is light, in all its modes and variations, various colours in kind, in degree, in quantity; some lively, others faint; more of some and less of others; various in their bounds or limits; various in their *order* and situation” (*TVV*, Berkeley 1948–1957: I, 44; *emphasis added*). He makes similar remarks in other writings. In *TVV* (I, 55–57), he goes on to offer a way to understand the mapping of visual extension in terms of a diaphanous plane placed perpendicular to the line of sight and marked off with a grid. The physical map, the diaphanous plane we write on to represent the visual field, does occupy physical space; the visual field so mapped does not:

It is true that this diaphanous plain, and the images supposed to be projected thereon are altogether of a tangible nature: But then there are pictures [that which is immediately perceived] relative to those [retinal] images: and those pictures have an *order among themselves*, answering to the situation of the images ... These pictures also are more or less faint, they and not the [retinal] images, being in truth the visible objects [that which is immediately perceived by visual sense].

(*TVV*, I, 57; *emphasis added*)

Terms like “physically flat” or “physically planar” simply do not apply to visual extension: “For when we say that [physical] pictures are plains, we mean thereby that they appear to the touch smooth and uniform. But then this smoothness and uniformity, or in other words this planeness of the picture, is not perceived immediately by vision” (*NTV*, I, 157).

Similarly, this is what Berkeley is getting at when he says (*NTV*, I, 158) that visual extension is no more planar than it is physically three-dimensional. One cannot run a finger across visual extension to determine whether it is tangibly flat rather than three-dimensional. The task is contrary to reason. Although the visual-field place order has two axes and hence is two-dimensional, the dimensions are not physical. That the mapping of visual extension is two-dimensional does not mean it is a physical surface.⁸

For Berkeley, his contemporaries, and many today, the reason the visual field place order is two-dimensional follows from facts about light, optics, and the eye. “For distance being a line directed endwise to the eye, it projects only one point on the fund of the eye, which point remains invariably the same, whether the distance be longer or shorter” (*NTV*, I, 2). Consider the example discussed above concerning a tree viewed against a more distant mountain. The physical tree occludes everything behind it along a line of sight. No light rays reach the eye from these physical locations. They form no image on the retina. Although the mountain may be miles behind the tree in physical space, in the visual field the phenomenal tree and mountain are next to one another at the boundaries of the visually experienced tree. There are no MV between them. In order to determine the distance relations between the tree and mountain in physical space, the visual system has to convert the information contained in this two-dimensional visual field array, along with other cues, into a three-dimensional tangible representation of the world.

The main problem in the scientific study of space perception was, and largely still is, to explain how we see the world in three dimensions given that the stimuli on the retina is a two-dimensional array of light. Descartes confronted the problem, and his solution was geometrical, what today some call an “inverse-optics” approach. On the basis of information contained in the visual field and other visually related sources, we compute back to the layout in space from which the information originated. Berkeley, facing the same problem, offered a different solution, one that did not involve computations based on the laws of geometry and optics. His involved the use of cues available in the visual field and other visually related sources to coordinate visual experience with experience of touch and motion.⁹

Berkeley's explications

For Berkeley, the principles and tools employed in his construction of sensory orderings apply quite generally. Thus, he says, “There is also distance between a Slave & an Emperour, between a Peasant & Philosopher, between a drachma and a pound, a farthing & a Crown etc. in all which distance signifies the number of intermediate ideas” (*Philosophical Commentaries*, Berkeley 1948–1957: I, 447).¹⁰

Clearly, Berkeley's use of the terms “distance” and “between” here do not refer to distances or locations in either tangible or visual extension or for that matter in any ordering of the sense modalities. Instead, they reflect likeness relations among the ideas, as measured by the number of ideas between them.

Berkeley does not believe that the common usage of these seemingly spatial terms is inconsistent with his heterogeneity thesis. After all, he has no qualms using the terms “minima” and “sensibilia” to denote both MV and MT, although they are heterogeneous. Also, Berkeley would not shy away from using the numeral “4” to assign cardinality to collections of four sounds, smells, tastes, itches and colors, as well as four rocks, apples and rivers. And while the initial introduction of the term “high” may have been with respect to physical heights, it can be used as well to denote ordering relations between sounds, rank, monetary

value, degrees of authority, risk, and esteem. It is also possible to give a general definition of these various uses of “high.” Metaphorically speaking they all mean something like “near one stipulated extreme end of a scale ordering of the property being assessed.”

The same holds for Berkeley’s use of the term “extension.” Although, it is applicable to sight and touch, the items referred to, arrays of MV and MT, are qualitatively different. Berkeley allows, then, that the common usage of a term across heterogeneous domains does not imply the things it denotes are of the same ontological type. If taken as non-abstract general terms, such multi-category applications of words pose no problem for his heterogeneity thesis. If, instead, they are taken as abstract ideas, Berkeley would have some serious explaining to do.¹¹

Berkeley on orientation and situation

Perhaps Berkeley’s most penetrating and original analysis of space perception is to be found in his solution to the problem of the inverted retinal image. Berkeley accepts the standard view of most of those working in vision theory that the ordering of visual-field places reflects a structural ordering of the physical light striking the retina.¹² The immediate objects of sight bear a fixed or “constant” relation to the organization of the physical retinal image. In vision science, the claim that the order of the visual field reflects the organization of the retinal image came to be called, “the constancy hypothesis.”¹³

This widely held assumption, however, gave rise to a troubling problem for theories of optics. For hundreds of years, scientists attempted to determine the optics of light in relation to the lens of the eye. The correct answer is that the physical image on the retina is inverted with respect to the physical layout of the environment. While there had long been evidence supporting this account, many found it unacceptable. A main reason theorists rejected it was that given the constancy hypothesis, they were at a loss to square retinal image inversion with the fact that we see the world right side up. Once Kepler proved that the retinal image was indeed inverted, vision theorists felt compelled to determine how the visual system reinverts the upside-down picture on the retina so that things look the way they actually are. A range of solutions were offered to solve the puzzle (see Lindberg 1976).

Berkeley’s response to the puzzle was radical. He attempts to dissolve the problem, not solve it. For, as he reminds readers, we do not see our own physical retinal image. In the sections of *NTV* on situation, Berkeley argues that the inversion puzzle results from conflating visual extension with tangible extension. The physical retinal image is definitely inverted with respect to its source in the physical world. However, he explains, this does not mean that the phenomenal visual experience is inverted with respect to the physical world. This claim is not false; it is incoherent. The visual field simply has no orientation in physical space. The visual field as a whole, and the MV locations that constitute it, themselves have no *inherent* direction in tangible extension. Places in the visual field only have locations relative to one another. It is only after sight and touch have been correlated that it even makes sense to talk about locations in the visual field with respect to our bodily self and its locations in physical space.¹⁴

Berkeley’s solution to the problem of the inverted image has important significance for issues concerning the perception of egocentric direction in general. Consider again Berkeley’s description of visual-field place locations as mapped onto a diaphanous plane. Critics wrongly assume that since it makes sense to distinguish left and right and up and down with respect to the diaphanous plane, it follows that there must be inherent left and right and up and down in the phenomenal visual array. But this is to conflate properties of the physical map with

that of the phenomenal mapping of MV in visual extension. Directions like up or down and right or left are essentially egocentric directions in physical space. Such an assignment of visual place only makes sense if visual extension has a location in physical space, and as argued in his discussion of the inverted retinal image, this Berkeley denies. Visual extension and the places in it do not share a common space with tangible extension and places. The two extensions are heterogeneous.

For Berkeley, it follows that it is only after vision is correlated with touch that vision can provide information about egocentric direction. This is entirely different from claiming that visual extension itself or arrays of MV in visual extension ever were or now are right and left or upside-down in physical space. For with respect to what could they be? MV do have locations in visual extension, but it is relative to each other not to our physical body or anything else that is tangible. To claim that MV are next to one another in extension only means there are no MV between them. MV themselves cannot possibly be located in tangible or physical space. Once again, terms like “next” and “between” are not to be understood as touching or being next to something in physical space. This is to run together visual and tangible extension and locate the places that constitute them in a nonexistent phenomenal common space.

Thus, the infant or the Man Born Blind (MBB), upon gaining sight, would have no idea where to point in physical space so as to assign a direction, say, of a red dot in their visual fields. Both could assign egocentric directions by sight only after they have learned to correlate the visual with the tangible. Berkeley goes on to argue that once sight and touch are coordinated, the infant and MBB would not only report seeing the red dot as coming from a place in the world, but they, as we, would find it difficult to perceive its location otherwise. In practice, it is almost impossible to separate our immediate experience of the visual field with the mediate tangible meaning-based experiences they trigger. Visual extension and tangible extension, nonetheless, are and always remain heterogeneous.¹⁵

Berkeley knows that a further obstacle must be overcome if he is to convince people that visual and tangible orientation are heterogeneous. Opponents will point out that in both sense realms phenomenal feet are next to the phenomenal ground, and the phenomenal head is next to the phenomenal sky. Therefore, by using this information, the MBB will be able to tell the spatial orientation of things in the world immediately on gaining sight. In his response, Berkeley does not deny these descriptions of the visual field prior to correlating sight and touch. Rather, he attempts to explain why these similarities of organization of feet to ground and head to sky do not challenge his distinction between place relations within visual extension and place relations within tangible extension. Relative location in the visual field has no inherent connection to egocentric orientation in the visual world. Moreover, appeals to common shapes will not help, for, as discussed below, Berkeley argues that tangible shape neither resembles nor has any necessary connection to visual shape.

According to Berkeley, before sight is correlated with touch, visual extension has a relational order, but the ordering does not depend on having tangible experience. To bolster his case, Berkeley appeals to a thought experiment. He asks us to consider an unembodied spirit who has no tangible sense (*NTV*, I, 153–159). Berkeley claims that the spirit “sees perfectly well”; his visual field, like ours, is a two-dimensional ordering of MV. For it is not necessary to have a physical body in order for places in the visual field to be next to or between one another. Lacking a body and tangible experience, though, the spirit could not assign egocentric locations to the places in his visual extension. Similarly, although newborns and the MBB upon gaining sight “see perfectly well,” they still have much to accomplish before they can make their way in the world, since visual experience has neither inherent directional nor any other tangible significance until sight is correlated with touch.

It is interesting to examine here Reid's treatment of the issue and his oft-cited criticism of Berkeley's analysis of direction. Reid does accept Berkeley's claim that distance cannot be perceived immediately but denies Berkeley's analysis of spatial orientation. Based on the work of Porterfield, Reid argues that direction is given directly or immediately in visual experience. He maintains that without inference the visual system assigns direction to places in the visual field corresponding to the angle at which light rays projected on the retina intersect the center of the eye. In turn, Reid does not accept Berkeley's attempt to dismiss the problem of the inverted image as bogus. For Berkeley, however, Reid's analysis would not settle the issues at stake as he sees it. First, Reid agrees with Berkeley that physical extension "is originally perceived by the sense of touch only" (1997: 175). Second, the center of the eye is a location in tangible extension, and Berkeley's fictional spirit would not have an idea of his own egocentric location. On this latter point, Reid (1997: 275) seems to agree. In explicating his position, he introduces a fictional Idomenian, who like Berkeley's spirit, has no tangible sense. Reid concludes:

An Idomenian, tho he assigns a place to every object of sight, yet he would never assign a place to himself; or if he did, he would be much as puzzled to find his own place in the whole experience of space, as we are to find the seat of the soul.
(1997: 275)¹⁶

The Molyneux Problem

Over the years, one of the most discussed issues concerning Berkeley's heterogeneity doctrine is the negative answer he gave to Molyneux's question, "Whether [the MBB given sight], before he touched them, ... could now distinguish and tell which is the globe, which the cube?" (NTV, I, 132).¹⁷ Molyneux's MBB thought experiment had been introduced as a way to help settle the ongoing debate between those who argue in favor of common sensibles and those who deny that sight and touch share spatial properties. Each side allows that after the MBB is given sight he will be able to acquire the visual skills needed to discern and label tangible figures. Everyone also agrees that the MBB, like the rest of us, will come to use the same terms to describe both visible and tangible figures. Again, Berkeley does not see such common usage of a term as challenging his heterogeneity thesis. His critics do. They believe these shape terms are univocal and argue that this common usage is explained by resemblances or necessary connections among the arrays of visible and tangible extension. Thus, their answer to Molyneux's question is "Yes." Berkeley claims that what holds for distance, magnitude, and situation applies as well to shape. He rejects the idea that phenomenal similarity, shared spatial properties, or a-priori reason can explain the connection between visual and tangible figure. Thus, his answer is, "No."

The structure of his argument here is interesting and often ignored. Berkeley begins by reiterating claims about the relationship between the senses offered earlier in NTV. And he maintains that the MBB will fail the Molyneux test, because, "Visible figure and extension *having been demonstrated* to be of a nature entirely different and heterogeneous from tangible figure and extension" (NTV, I, 137; emphasis added). Right off this claim is not so much an argument, but a repeat of the position he has already sought to defend. This, though, is understandable given that his discussion of the Molyneux problem comes up after he has used MBB thought experiments to argue for the heterogeneity of visual and tangible extension with regard distance, magnitude, and orientation. Berkeley thinks his arguments with regard to these spatial properties carry over to his analysis of shape perception. Just as a

visual line and a tangible line cannot be combined to form a single line that is the size of the two combined, a visual line cannot be combined with a tangible line to form the shape of the letter T. Moreover, Berkeley believes that this all stems from the problem of inverted images: “[the] solution to this knot about inverted images seems the principal point in the whole Optic Theory, the most difficult perhaps to comprehend, but the most deserving of our attention, and, when rightly understood, the surest way to lead the mind into a thorough knowledge of the true nature of Vision” (TVV, I, 96).

Berkeley, though, appreciates that it will be much more difficult to convince people of the heterogeneity of shape than that of other spatial properties he has already canvassed. For he is well aware that his opponents’ intuitions about there being resemblance and necessary connections between visual and tangible shape are hard to resist. Berkeley appreciates the appeal of these intuitions and is aware that he must show that shape properties, too, are entirely distinct, *in spite of the fact* that arrays of visible and tangible extensions each have figure and the same terms are used to describe shapes in both. To account for these strong intuitions, Berkeley argues that there is a sense in which certain visible shapes may be more *fitting* to be correlated with certain tangible shapes than others. Many critics, such as Adam Smith, argue that his appeal to fittingness undermines his heterogeneity thesis because such fitting entails that there is a resemblance relations or necessary connection between shapes experienced in the two modalities.

Berkeley responds to such criticism with an analogy. He argues that the fittingness of visual and tangible shapes is like the correlation between written and spoken letters. There is one written letter for each spoken letter because it is a more fitting (simpler, more obvious) way to correlate them than other coordination schemes. That the same name is given to both verbal and written letter pairs does not mean that there is a resemblance relation or necessary connection between the letters and sounds.¹⁸ Berkeley did not find a need to make similar claims about fittingness when it came to the other spatial properties he had examined. Unlike these properties, shape is a matter of structure, and its intuitions about a common structure that underlies convictions that the MBB could pass Molyneux’s test.

Once again, Reid prominently objects to Berkeley’s account of matters. Fittingness of the sort Berkeley appeals to in explaining the common use of shape terms is not to the point. The letter analogy does not apply well to shape since it does not reflect the structural relations that define shapes. According to Reid, if attention is paid to such *structural* similarities, the MBB would be able to use reason to successfully answer Molyneux’s question. Now Berkeley does not deny these “abstract” structural similarities (NTV, I, 137). For example, a line in both visual and tangible extension will be the shortest distance between two points, and a square in both will be a closed figure composed of four straight lines and four right angles. What Berkeley does deny is that there is a likeness in the experience of the MV that compose the visible square and the experience of the MT that compose the tangible square.

Reid in a way agrees. He allows that if, as Berkeley insists, the visual field is purely mental (i.e. what is given immediately in visual experience has no inherent external reference), Berkeley’s analysis is correct: “We shall allow, that, if visible objects are not external, but existed only in the mind, they would have no [common] figure, or position, or extension ... or that there is any resemblance between them and the objects of touch” (Reid 1997: 119). As indicated in Reid’s analysis of direction, however, he denies Berkeley’s premise. He believes places in the visual field point in the direction of places in the world.

Berkeley on organization

A number of other controversies in interpretations of Berkeley's idea of extension depend on conflicting accounts of his views about there being an inherent order of visual extension itself. Various proponents as well as critics of Berkeley believe that several things he says imply that the visual field is chaotic or unorganized at birth. If this is what Berkeley assumed, then it is obvious why he thought the connection between visual and tangible extension had to be learned. But there is no justification for thinking this was Berkeley's position. The faulty reasoning behind such interpretations of Berkeley's view often go something like this. It is assumed that it is not possible to make sense of the two-dimensional ordering of visual extension, unless this order is understood in terms of a physical spatial ordering. Berkeley, though, insists that visual experience cannot inform us where things are in space until it is brought in line with tangible experience. Hence, visual extension cannot be ordered at the start, for then there would be no need to learn the correlation of sight with touch. Visual experience would already have a tangible order.

Reflection on Berkeley's treatment of the classic problems in vision science discussed above, however, indicate that this is not a proper reading of his views. Consider, for example, the puzzle over the inverted image. Berkeley argues that when his position on the heterogeneity of visual and tangible extension is understood, the problem turns out to be bogus. It results from conflating place relations in the visual field with place relations in the perception of the visual world. Berkeley thinks his theory's ability to dissolve this long-standing optical dilemma provides strong evidence that his heterogeneity thesis is correct. Now, whether or not one finds Berkeley's solution to the inverted image puzzle acceptable, if visual extension were initially unorganized or chaotic, Berkeley's analysis would not have spoken to the issue at stake. For the puzzle of inversion could not arise, as it historically did, unless it was assumed that visual extension is so ordered. Without this assumption or something comparable, it would simply make no difference which direction the projected light falls on the physical retina, for the order of visual extension would bear no fixed relation to the retinal image. The initial phenomenal field would be an unorganized display of color and light on all orientations of the physical retinal image, including an erect orientation on the retina. Thus, there would be nothing exceptional about the case of retinal image inversion, and little reason for it to attract the special attention it did.

Consider next Berkeley's claim that spatial perception is learned. If he assumed that initially the infant's visual field is an unordered array of color and light, it is obvious why he would reject any suggestion that there is an inherent resemblance or necessary connections between the visual and tangible extensions. It would also be obvious why he thought the linking of the senses required learning. An unordered visual extension cannot possibly tell us anything about the distance, size, direction, and other spatial properties of objects in tangible space. But this is neither how Berkeley nor his opponents saw the situation.

Before Berkeley, and well into the twentieth century, it was widely assumed that vision is a two-stage process involving a transition from sensation to perception (or, in Berkeley's terms, from immediate to mediate perception). Barring injury, physical fatigue, drugs, and the like, the outputs of sensory systems are immediate and fixed. They cannot be influenced either by learning or thought. The qualities of sensations are a function of the physiology of the sense organs and the properties of the stimuli to which they are responsive.¹⁹ Theorists did differ in their accounts of the origins and nature of the processes that led from sensations, that which is immediately experienced, to that which is mediately perceived. Some, like Berkeley, stressed the need for experience to establish the transition. Some stressed the role of

computations. Others attributed the transition to a-priori or innate knowledge, biases, and constraints. And those agreeing with Reid held that direction at least was directly seen.²⁰

Berkeley accepted this two-stage framework as basic, and his whole account of spatial perception is couched in constancy-hypothesis terms. Consider, for example, his discussion of the perception of magnitude in sections 52–87 of the *New Theory of Vision*. We perceive a tower that is hundreds of feet away as having a fixed physical/tangible size. Yet, as we approach it, the retinal image of the tower occupies more and more space on our retina. The phenomenal visual experience of the tower contains increasingly more MV; it takes up larger and larger portions of the visual field. As we move, what we see immediately is in flux. In order to perceive the tower's constant tangible size, we must "read through" the changes in the visual field that accompany movement. But, according to Berkeley, our ability to do so is acquired, not innate.

Berkeley's account as well as his opponents' accounts of the perception of magnitude, though, presupposes that visual extension is organized, not an unstructured jumble of color and light. Although the number of visual places occupied change as we move about, the phenomenal places the tower projects are ordered, they are next to one another in the visual field. Determination of tangible size by sight requires taking into account these facts about the size, locations, and organization of the MV the tower projects onto the retina.

Similarly, independent of whether one comes down on the "Yes" or "No" side of the Molyneux problem, Berkeley and most others concerned with the question took it for granted that the MBB's new visual experience is initially structured. After all, the MBB's task would be impossible if his visual field were unorganized. On gaining sight, the MBB is not asked if he can discern any order or arrangement of colors in his visual experience. It is assumed that the stimuli and arrays of MV that the physical sphere and cube give rise to have different visual shapes. As quoted earlier, Berkeley says, "The proper immediate object of vision is light, in all its modes and variations, various colours in kind ...; various in their *order and situation* (TVV, I, 44; emphasis added)." Likewise, in his response to Hylas in *Three Dialogues between Hylas and Philonous*, Philonous asks, "You will further inform me whether we immediately perceive by sight anything besides light, colour and *figures*" (*Three Dialogues between Hylas and Philonous*, Dialogue 1, Berkeley 1948–1957: II, 175, emphasis added). According to Berkeley, the organization of visual extension of the MBB on being given sight is not essentially different from that of a normal perceiver. Indeed, were the MBB's failure to give a correct answer to the Molyneux's question due to chaos or lack of organization of visual extension, his response would not be germane to the major issue about common sensibles that was at stake for Berkeley and other vision theorists.

One constructivist response to these criticisms is to admit that the traditional paradigm of space perception within which Berkeley worked and to which he responded depends on visual extension being organized. Still, it is argued that visual extension is not structured at the very start. Visual extension it is said is initially unordered and acquires its initial structure on the basis of tangible input. On this account, it is possible to admit that Berkeley's explanations of the puzzle of inversion, the nature of size perception, the Molyneux problem, and others discussed above, do presuppose an organized visual extension, but to also hold that these issues arise in their textbook form only *after* the chaotic array has been given order.

I believe that there are serious difficulties burdening Berkeley with any such view. For one, the MBB thought experiments do not allow any time for learning to occur. The test conditions stipulate the test is to occur "on first gaining sight." Another problem is that questions about order can be raised with respect to touch as well as sight. If the sensory organ of vision does not provide an order to visual extension, what is the basis for assuming the

sensory organ of touch provides original structure to tangible extension? Moreover, for Berkeley, aspects of visual perception that depend on learning and processes of suggestion are mediate. So, if the order of visual extension is constructed, experience of the visual field as organized would be mediate, not as he claims immediate. Finally, why would Berkeley saddle himself with the difficulties raised by an initially unorganized visual field, when he has available a widely accepted account of the ordering in terms of the constancy hypothesis?

Conclusion

I believe that Mill's assessment of the status of Berkeley's theory of vision in the history of vision science was on target when he states:

The doctrine concerning the original and derivative functions of the sense of sight, which ... is known as Berkeley's Theory of Vision, has remained ... one of the least disputed doctrines in the most disputed and disputable of all sciences, the Science of Man ... the warfare which has since distracted the world of metaphysics, has swept past this insulated position without disturbing it; and while so many of the other conclusions of the analytic school of mental philosophy ... have been repudiated with violence by the antagonist school, that of Common Sense or innate principles, this one doctrine has been recognized and upheld by leading thinkers of both schools alike.

(Mill 1993: 84)

While much has changed since Mill's assessment of Berkeley's theory of vision, and it no longer can be said to be the "least disputed doctrine" in vision science, its impact and influence on the way we understand the core problems of perception and the lines along which they are studied remain strong. Berkeley's idea that the correlation of the visible with the tangible is needed to give physical space significance to visual experience remained a prominent view in visual science for several hundred years and is still alive in the form of motor or enactive theories of perception. Similarly, although computational theories of vision are much in the forefront of current work, the eminent perceptual psychologist, J. Koenderink, has argued that "The topic of cues became important when Berkeley convincingly reasoned that inverse optics will never lead to any perception of ... egocentric distance. Although Berkeley is frequently ridiculed for his idea, the main point stuck and has never been refuted" (Koenderink 2010, 696).

What's more, Berkeley's particular accounts and solutions to classic problems in vision science, such as the moon illusion, the relationship between size and distance perception, the problem of the inverted image, the visual system's ability to compensate for distortions in the retinal image, the Molyneux question, and others issues of current study still impact the field.²¹

I have sought in this chapter to clarify, not defend, Berkeley's notion of extension, focusing on the role it plays in his theory of vision and its significance in the history of empirical vision science. I do not expect my explication will convince people to accept Berkeley's entire theory of vision, nor do I think it will convince them that his heterogeneity thesis is correct. At the same time, I believe my account of Berkeley's ideas about the nature of visual and tangible extension, and the uses he makes of the distinction between them in resolving various core problems in the study of perception, can stand on their own. If correct, my reading does seem to raise problems for various interpretations of Berkeley's more epistemic and metaphysical positions. Although I did not pursue these philosophical issues here, I hope my analysis lays the ground for a more fruitful discussion of them, as well as a better appreciation of Berkeley's contribution to vision science.

Notes

- 1 In the *NTV*, Berkeley tends to identify tangible extension with *real* or physical space. In later writings, he does not (e.g., *Principles of Human Knowledge*, Berkeley 1948–1957: II, 44). Touch and vision are ontologically on par, although tangible experience is pragmatically more important in guiding our activities in world. I believe that for the points I wish to make about the place of Berkeley's ideas of extension in the empirical study of vision, the problems that arise from this ambiguity can largely be skirted. For an understanding of Berkeley's metaphysical and epistemic positions more would need to be said.
- 2 In his pioneering work on Berkeley's theory of vision, Armstrong (1960), explores a range of interpretations. For a sample of some more recent attempts to explicate and challenge Berkeley's idea of visual extension see Falkenstein (1994) and Grush (2007).
- 3 Falkenstein (1994) distinguishes "strict constructivism" from "intuitionism." The former position is that the two-dimensional structure of visual extension is constructed. See discussions in Bailey (1842), Pastore (1971), and Morgan (1977). The intuitionist claim is that visual experience of three-dimensional space is constructed, but that its two-dimensional ordering is not. People adopting either of these positions, however, often assume the two-dimensional order is physically spatial. For a recent attempt to argue that the two-dimensional order is both non-spatial and constructed, see Hara (2004), Atherton (2008). For a general review of the issue, see Hatfield (1990).
- 4 In domains where matching or just noticeable difference judgments are inapplicable, the data are usually judgments of more or less similarity. Berkeley does not clearly separate the three methods, and in different contexts makes use of non-technical versions of each.
- 5 It is most important to keep in mind, here and throughout, the distinction between a phenomenal place ordering of the visual *field*, and the more commonly explored issue in vision science concerning the geometry of the physical *world* visual experience (re)presents. Some distinction between visual field phenomena and our perception of the physical layout, the visual world, is recognized by most theories of vision science. This distinction is separate from whether one adopts a materialist, physicalist, immaterialist, or phenomenalist ontology as basic. For a discussion of these matters, and for analyses of the construction of visual place orders, as well as other sensory orderings of visual experience see, Carnap (1967) and Goodman (1966).
- 6 Over the years, there have been numerous papers arguing that Berkeley's idea of minima is incoherent. See Smith (2000), for an updated version of such criticisms arguing that Berkeley's position also conflicts with modern theories of vision. See my book (2004a) for a different analysis of Berkeley's concept of minima, and an account of why he allows that minima are not the only units that can be employed in measuring phenomenal extensions.
- 7 For a discussion of problems Berkeley faces here, see Ganson (1999).
- 8 See Armstrong (1960: 55) and Bracken (1987: 437 ff.) for further discussion of these matters.
- 9 For a more in-depth discussion of this difference and its significance in vision theory, see Schwartz (1994) and papers in Schwartz (2004b: Part III).
- 10 In cases like these, judgments of more or less similar (not matching or just noticeable difference) are likely to provide the data for constructing the orders. See Gray (1978: 424 ff.) for further discussion of this general notion of distance in an order, defined in terms of the number of intermediate ideas.
- 11 It is not possible here to enter into the many controversies over the proper interpretation of Berkeley's notion of an abstract idea, nor is there space to consider the implications these different accounts may have for positions Berkeley espouses elsewhere in his philosophy. See, for example, Atherton (1987), Bolton (1987), Pappas (2002), Hight (2008), and Reckless (2013).
- 12 Berkeley mentions this assumption in describing the mapping of visual extension onto a diaphanous plane.
- 13 The *constancy* hypothesis must be distinguished from claims about the constancy of our perception of color, size, shape, et cetera. It was the acceptance of both these hypotheses that gave rise to a major field of study in vision science. Since the retinal image changes with every change in viewing distance, direction, and lighting, and the visual field alters accordingly, how can we explain that we perceive items in the world as having constant colors, sizes, shapes, et cetera. In Berkeley's terms, our immediately perceived sensations "have an order among themselves [in visual extension] answering to the situation of the [retinal] images" (*TVV*, Berkeley 1948–1957: I, 57), i.e. the *constancy* hypothesis. Nonetheless, the tangible properties of the world are perceived to be stable. Thus, we have to "read through" these immediate sensations to our mediate ideas of a *constant* world.

- 14 See Atherton (1990) for a detailed account of Berkeley's treatment of inversion. See Stratton (1896), where he cites Berkeley's analysis of orientation as motivating his groundbreaking study of the effects of wearing inverting lenses on visual experience. See vision theorist Rock (1966) for a forceful defense of Berkeley's position and its importance for understanding the nature and mechanisms of perceptual orientation. Rock (1966) also found that after subjects wearing inverting glasses had time to adjust their motor behaviors, they still experienced orientation problems. They were at a loss to say what was oriented with respect to what, including their own body. See below Berkeley's discussion of assigning egocentric direction to places in the visual field.
- 15 See Evan's (1985) influential argument that contrary to Berkeley's claim, visual experience not only assigns egocentric direction to visual extension but it is conceptually necessary that it do so.
- 16 For a discussion of related concerns, see Grandi (2016). Attempts to account for the directional content of visual experience became a major topic of empirical research in the nineteenth century with the work of Lotze. Lotze had metaphysical reasons for claiming that visual experience could have no inherent directional significance, and he offered his theory of local signs to account for its development. For a review of the history of local signs in theories of vision, see Rose (1999) and Koenderink (1990). For more philosophical context to the issue, see Hatfield (1990) and the volume of *Topoi* (2016) that focuses largely on Reid's views about the geometry of physical space that visual appearances assign to it. More will be said below on the differences between Reid and Berkeley on direction in their conflicting treatments of the Molyneux problem.
- 17 For a discussion of the historical importance of the issue, see Cassirer (1962). See Morgan (1977) for a discussion and summary of empirical studies of the topic. See Eilan et al. (1993) for more recent debates over the Molyneux problem.
- 18 There is, of course, an important difference between this language example and Berkeley's treating vision as a language. While the correlations between word and object in natural language are of human devising, God has structured visual language in a way that makes it well suited or *fitting* for us to readily acquire the correlations between vision and touch. I cannot delve here into issues concerning the implications commentators discern in Berkeley's calling the system of visual/tangible correlations a "language." While some see this important for Berkeley's philosophical theses, this use of the label is not significant for the issues in vision science I am examining.
- 19 See Mueller (1842), for a later, classic explanation and statement of the doctrine.
- 20 See Hatfield and Epstein (1979), Schwartz (1996), and Hatfield (2015).
- 21 See Schwartz (1996) for more details. For a collection of important historical and contemporary papers on these topics, see Schwartz (2004b) as well as references to literature in endnotes 7, 17, 19, 20, and 22 above.

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12

BERKELEY VERSUS REID ON THE MOON ILLUSION

James Van Cleve

Who has not caught sight of the newly risen full moon and exclaimed, “My, what an enormous moon!”, thinking it much larger than usual and finding this impression confirmed when later in the night and higher in the sky, the moon has reverted to its normal size? This is the moon illusion. The horizon moon appears to be half again as large as the elevated moon, despite being no larger in the angle it subtends at the eye or the proportion of the visual field it takes up. You may verify the sameness of angular size by comparing the moon at both elevations with the tip of your little finger or measuring the moon’s image in photographs. What accounts for the fact that the moon appears to be so much larger at the horizon? More than a dozen theories have been proposed, but to this day none has won out over the rest of the field (Hershenson 1989; Ross and Plug 2002). One author calls the moon illusion our “our longest-standing scientific puzzle” (Egan 1998: 605, 621). My aim in this paper is to set out the competing explanations of the moon illusion offered by Berkeley and Reid and to show why neither of them can claim the prize.

The shared background: the perception by sight of distance and size

I begin by setting out the framework for the perception of spatial attributes by sight developed by Berkeley in his *Essay towards a New Theory of Vision* and taken over in good part—but also rejected in good part—by Reid. Berkeley announces his plan in the opening sentence: “My design is to show the manner wherein we perceive by sight the distance, magnitude, and situation of objects. Also to consider the difference there is betwixt the ideas of sight and touch, and whether there be any idea common to both senses” (*New Theory of Vision* [NTV], 1).¹

The rest of the work falls into four quadrants, each devoted to one of the opening questions: sections 2–51 to the seeing of distance, 52–87 to the seeing of size, 88–120 to the seeing of situation or orientation, and 121–159 to the question whether any ideas or percepts are common to sight and touch. His account of seeing distance is to some extent his model for seeing all the other spatial attributes.

So how *do* we see distance—that is, outward distance or “outness”—according to Berkeley? The short answer is that we don’t. More fully, we do not see it *immediately* (in Berkeley’s term) or *originally* (in Reid’s).² The proper or immediate objects of vision are simply lights and colors arrayed in two dimensions, along axes of left-right and above-below, but not near-far. We can

see one object as being *next to* another, but not one object as being *further away* from us than another. We come to know originally about outward distance only through movement and touch—we discover that we have to advance twenty paces before we bump into the tree. But once we have learned enough of the systematic correlations between distance as gauged by movement and touch and various cues that are given to vision, we have a mediate or mediated perception of distance by sight. That is to say, on the occasion of certain visual or ocular cues, we can know at a glance the relative distances of various objects from us. The passage of our minds from the sign to the thing signified becomes so automatic that Berkeley declines to call it inference, saying that the signs *suggest* distance to us.

Berkeley identifies three visual or ocular cues that let us know distance by sight: the sensation of turning the eyes in or out as we try to bring things into focus (*NTV*, 16), the greater confusion or blurriness of nearer objects (*NTV* 21), and eye strain as we seek to prevent such blurriness (*NTV* 27). I say “visual or ocular” because sensations of eye-turning and eye strain are not things seen. Latter-day psychologists have identified many more properly visual cues, including the occluding of one object by another and the apparent convergence of presumably parallel lines receding into the distance. These are the so-called pictorial cues, the cues a painter could use to make colors on his two-dimensional canvas suggest depth.

Reid studied Berkeley’s theory of vision closely and took over several of its key contentions. He agreed that distance is not immediately perceived by sight but only suggested to our minds by visual cues. His own list of cues includes Berkeley’s and several more, including (1) the felt “trim” of the eye as it adapts to objects at different distances; (2) the felt effort in producing the inclination of the optic axes as they converge (Berkeley’s main cue); (3) the faintness and degradation of colors at greater distances; (4) intervening objects whose distance is independently known to us; and (5) the visible magnitude of objects whose real size is known to us (*IHM*, 6.22, 178–187). He even made the perception of distance by sight the paradigm of what he called “acquired perception,” an important extension of our cognitive capacities wherein we learn to perceive by one sense features given originally only to another (*IHM*, 6.20–24 and *EIP*, 2.21–22). An attribute B not originally perceived by sight (e.g., outward distance, heat, weight) is correlated with an attribute A that is genuinely given to sight. As time goes by, we become apprised of these correlations. Eventually, we come to think of B whenever we perceive A—so automatically that we may take ourselves actually to be perceiving B. When a sphere of one uniform color is placed before us, all we could have seen originally (and perhaps all we strictly see now) is a two-dimensional disk with a gradual variation of color, but we take ourselves to be seeing a three-dimensional globe:

It is experience that teaches me that the variation of colour is an effect of spherical convexity, and of the distribution of light and shade. But so rapid is the progress of the thought, from the effect to the cause, that we attend only to the last, and can hardly be persuaded that we do not immediately see the three dimensions of the sphere.

(*EIP*, 2.21.236)

Reid pays homage to Berkeley in the following quotation:

The Theory of vision ... contains very important discoveries, and marks of great genius. He distinguishes, more accurately than any that went before him, between the immediate objects of sight, and those of the other senses which are early associated with them. He shews, that distance, of itself, and immediately, is not seen;

but that we learn to judge of it by certain sensations and perceptions which are connected with it. This is a very important observation; and I believe, was first made by this author.

(EIP, 2.10.140)

But Reid does not agree with everything Berkeley says about the visual perception of spatial attributes. As we shall see, he does not agree with all of Berkeley's views in the other three quadrants of the *NTV*. Nor does he agree with Berkeley completely even in the case of perceiving distance, as we may see by comparing their views to those of common sense. A person of common sense thinks that there are objects at various distances from us, that we see these objects, and that we see their distance immediately. Berkeley and Reid both depart from common sense in rejecting the last of these, the belief that we see distance immediately. Reid makes no further departures, but Berkeley makes two. First, he holds that the things whose distance we know by sight are not strictly seen by us; they are objects of touch only. The moon we see is a small yellow disk, but there is no small yellow disk where we take the moon to be, some 240,000 miles away (*TV*, 44). The only object at that distance from us is the tangible moon. Second, although Berkeley allows the reader of the *NTV* to believe there are objects at various distances from us (such as the moon just spoken of), he intimates in the *Principles of Human Knowledge* that nothing is really at any distance from us, spatial distance being reducible to the length of time required to attain certain tangible ideas:

So that in strict truth the ideas of sight, when we apprehend by them distance and things placed at a distance, do not suggest or mark out to us things actually existing at a distance, but only admonish us that ideas of touch will be imprinted in our minds at such and such distances of time, and in consequence of such and such actions.

(*Principles of Human Knowledge* [PHK], 44)

So we have four progressively more radical views, with Reid occupying row 2 and Berkeley row 4 of Table 12.1.

Knowing things that were not known in their day, I believe Berkeley and Reid are both wrong in the point on which they agree—that we do not see distance immediately. There is a way in which we can perceive distance with our eyes alone without relying on touch, namely, stereopsis. Our two eyes receive slightly different views of any object toward

Table 12.1

	<i>Are there objects at a distance from us?</i>	<i>Do we see these objects?</i>	<i>Do we see the distance of these objects immediately?</i>
The view of common sense	Yes	Yes	Yes
Reid and Berkeley up to <i>NTV</i> , 44	Yes	Yes	No
Berkeley in the rest of the <i>NTV</i>	Yes	No	No
Berkeley in <i>PHK</i> , 42–44	No	No	No

which both are directed, and the amount of discrepancy between the views enables our visual systems to calculate the relative distances of objects and make us perceive differences in depth. There are even specialized neurons for registering the discrepancy. (For further discussion of these points, see the appendix on Stereo Sue in Van Cleve [2015].³)

Moving to the topic of the second quadrant, the perception of size by sight, we find again that Reid takes up some but not all of Berkeley's teachings. Berkeley distinguishes between visible magnitude and tangible magnitude. Visible magnitude is a proper or immediate object of vision, which we may be aware of when we see one line as being longer than another. The visible magnitude of objects varies as we move about. The tangible magnitude of objects, by contrast, remains constant as we move in relation to them. As I bring a basketball from arm's length to just in front of my face, its tangible magnitude remains constant, but its visible magnitude increases rapidly until it takes up nearly all my field of view. To speak more accurately, what increases is not "its" visible magnitude (that of the tangible basketball) but the magnitude of a correlated visual object, since on Berkeley's view nothing is an object both of sight and touch and nothing possesses both visible and tangible magnitude (*NTV*, 49). To speak more accurately yet, there is no increase in the magnitude of any one visible object, but only the rapid replacement of one visible object by another of greater magnitude—a succession of orange and round visible objects, each greater in visible magnitude than the last.

Tangible magnitude is the variety of magnitude of greater practical concern to us (*NTV*, 59)—we need to be apprised of it in order to know whether we can move a table through a doorway or whether a dog approaching us from across a country lane is large enough to be a threat to us. We do not perceive tangible magnitude immediately by sight, but we do learn to perceive or accurately estimate it on the strength of certain visual cues, just as we do in the case of tangible or outward distance (*NTV*, 51). Visible magnitude is one of the cues—we learn that other things being equal (for instance, distance being equal), objects that are visibly larger are also tangibly larger (*NTV* 51). The tree whose visual image is taller will take me longer to climb. There are other visual cues as well; greater confusion is a sign of lesser size, greater faintness a sign of greater size (*NTV* 56–57).

Reid took over Berkeley's distinction between visible and tangible magnitude and made important use of it in his own philosophy, notably in refuting the following argument by Hume: "The table, which we see, seems to diminish as we remove further from it; but the real table, which exists independent of us, suffers no alteration. It was therefore nothing but its image which was present to the mind" (Hume 1997, 152).

Hume's conclusion, that we perceive only images or ideas and not external things, was anathema to Reid. He therefore undertook to expose the fallacy in the argument, which he thinks has true premises only if we reconstruct it as follows (*EIP*, 2.14.180–182):

- 1 What I see diminishes in *apparent* magnitude as I retreat from it.
- 2 The table itself does not diminish in *real* magnitude as I retreat from it.
- 3 Therefore, what I see is not the table (but only an image or idea).

"Apparent" and "real" magnitude are Reid's terms for Berkeley's visible and tangible magnitude. As Reid develops the distinction, the real magnitude of an object (such as the edge of a table) is an intrinsic property of it, measured in inches or feet, whereas the apparent magnitude of an object is a relation between the object and a perceiver, measured by the angle the object subtends at the eye.⁴ "Linear size" and "angular size" are two more modern terms for this distinction. Apparent size or magnitude varies with the distance between

object and perceiver (objects subtending smaller angles when further away) while real magnitude does not. Once we record these facts correctly as in Reid's version of the syllogism, we see that the conclusion no longer follows. "I admit both the premises in this syllogism, but I deny the conclusion. The syllogism has what the logicians call two middle terms" (*EIP*, 2.14.182).

There is one big difference between Reid's distinction between the two varieties of magnitude and Berkeley's. For Berkeley, visible and tangible magnitude belong to distinct and heterogeneous objects; for Reid, apparent and real magnitude belong to the same objects. It is one and the same table that possesses a constant real or tangible magnitude (as an intrinsic property) and a varying visible magnitude (as a relational property). As Reid runs through the various topics in the new theory of vision, it is the identity of things seen with things touched that generally stands out as his most significant departure from Berkeley.⁵

Two explanations of the moon illusion: apparent distance and faintness

Berkeley seeks to confirm his main tenets in each quadrant of the *NTV* by demonstrating their application to a famous puzzle case. The puzzle case for the perception of size is the moon illusion.⁶

Explanations of the moon illusion may be classified as physical, physiological, or psychological. Physical explanations say the horizon moon produces a larger retinal image owing to external causes, such as the refraction of the light coming from it; such theories were advanced by Aristotle and Ptolemy (Plug and Ross 1989: 6–8). Physiological explanations say the horizon moon produces a larger retinal image owing to some cause within the eye itself; Leonardo and Gassendi both believed the horizon moon, being less bright, makes the pupils dilate, which in turn somehow causes the retinal image to expand (Plug and Ross 1989: 13–14). Explanations of both of these types are ruled out if the horizon moon does not in fact produce a larger retinal image, as is now believed. The explanations still in the running are all psychological, seeking to find some psychological mechanism that would make the horizon moon appear larger despite taking up no more space on our retina or no greater a portion of our visual field.⁷

Of the psychological explanations, one of the most venerable is the apparent-distance theory, sometimes erroneously attributed to Ptolemy and advocated in the eleventh century by Alhazen (Plug and Ross 1989: 9–10 and 18–20). It has been influentially defended in recent times by Kaufman and Rock (1962). The explanation has two main parts. First, the presence of various intervening objects—trees, farms, houses, or simply a plowed field—makes the horizon moon look farther away than the elevated moon. Second, with constant angular size, greater perceived distance means greater perceived size. This part is sometime called the size–distance invariance hypothesis. As a sheer matter of geometry, with angular size held constant, greater distance means greater linear size. An object far away can subtend the same angle at my eye as an object nearer to me only if it is greater in linear size. The size–distance invariance hypothesis goes beyond this, saying in effect that psychology tracks geometry: that of two objects of the same angular size, one that is perceived to be at a greater distance will also be perceived to be of a greater size. Put this together with the fact claimed in the first part, that the horizon moon appears to be farther away, and it follows that the horizon moon is perceived to be larger than the elevated moon.

Berkeley gives a different psychological explanation. He notes that when the moon is at the horizon, there is a greater tract of intervening atmospheric vapor between us and the moon than when it is overhead.⁸ Owing to the extra atmosphere, the moon is fainter at the horizon, and its faintness suggests to us larger size. The idea here is not what you might expect: that faintness is a sign of greater distance, which is in turn a sign of greater size in accordance with the size–distance invariance hypothesis. That was in fact the explanation proposed by Euler (Egan 1998: 609, n. 13). Instead, Berkeley believes that faintness is *directly* a sign of larger size, as well as of distance. As he says in *NTV* (53), size is perceived “as immediately” as distance—really meaning not immediately at all, but equally mediately from the same cue, not one by the mediation of the other.

Berkeley knew of the apparent-distance explanation, but he rejects it.⁹ He offers an empirical argument against that explanation in the following passage:

If the prospect of interjacent objects be that which suggests the idea of farther distance, and this idea of farther distance be the cause that brings into the mind the idea of greater magnitude, it should follow that if one looked at the horizontal moon from behind a wall, it would appear no bigger than ordinary.

(*NTV*, 77)

But, according to the understood premise in this *modus tollens* argument, the moon seen over a wall cutting off the view of intervening terrain *does* still appear abnormally large. In the first edition of the *NTV*, Berkeley had also claimed that the moon looks as big as ever when the horizon moon is viewed through a tube (*NTV*, 70).

If Berkeley’s claim is correct, it refutes the apparent-distance theory, showing that the phenomenon can occur in the absence of the purported explanation. But is it correct? Let Reid now enter the debate. Reid did not positively advocate a solution to the moon illusion, but he criticizes Berkeley’s solution and defends the apparent-distance explanation against Berkeley’s criticism of it in the following passage:

Bishop Berkeley therefore committed a mistake, when he attributed the large appearance of the horizontal moon to the faintness of her light, occasioned by its passing through a larger tract of atmosphere: for we are so much accustomed to see the moon in all degrees of faintness and brightness, from the greatest to the least, that we learn to make allowance for it; and do not imagine her magnitude increased by the faintness of her appearance. *Besides, it is certain that the horizontal moon seen through a tube which cuts off the view of the interjacent ground, and of all terrestrial objects, loses all that unusual appearance of magnitude.*

(*IHM*, 6.22, 184; italics added)

When I first read the italicized words, I was astonished. The horizon moon either continues to appear abnormally large when viewed through a tube, or it does not. How could Reid and Berkeley disagree on such a seemingly easily resolvable matter of empirical fact? It turns out, however, that many other investigators have disagreed on the same point. Molyneux and Euler are two among half a dozen or so who sided with Berkeley, saying that the horizon moon still looks larger when terrain is hidden. Malebranche and Porterfield are two among half a dozen or so who sided with Reid, saying that it does not (Plug and Ross 1989: 19; Ross and Plug 2002: 120).

I have made my own nighttime attempts to resolve the issue, but with inconclusive results. I found that viewing the moon through a cardboard tube did reduce the illusion—it made the horizon moon look smaller than without it. But it also made the *elevated* moon look smaller, in which case it cannot be concluded that the tube reduces apparent size because it eliminates intervening terrain. Moreover, I have several reasons not to put too much weight on my own observations. First, I am only one subject; second, I had no way of measuring my size estimates, which were comparisons of presently perceived size with remembered size; third, by viewing the moon through a tube I was replacing binocular by monocular vision, which could be a confounding variable.¹⁰

Brian Glenney has devised an instrument for viewing the moon through a tube and measuring its apparent size with some exactitude. It is essentially a telescope tube with its lens replaced by a camera aperture at one end, adjustable by the subject to make it exactly surround the perceived moon. Glenney did not have subjects compare the horizon moon with and without the tube (since the tube itself was his measuring device), but he did have them compare the newly risen moon and the elevated moon through the tube. In unpublished research, he found that five of six subjects found the newly risen moon significantly larger than the more elevated moon, despite the masking of all terrain. This would show that terrain is not a necessary condition for the moon illusion, reinforcing Berkeley's contention. I find his results puzzling, however, since it seems to me that his aperture device would exactly track the subject's retinal size. One closes the aperture until no ring of nonmoon surrounds the moon. Yet retinal size is supposed to be constant in the moon illusion, which is part of the puzzle.

Leaving disputes about the results of viewing through a tube to one side, one may still challenge the apparent-distance theory on at least three counts.

First, experiments conducted in a darkened planetarium have found a moon illusion despite there being no visible terrain or texture of any kind. Experiments of this kind were first done in aircraft hangars in 1925, but were challenged by Kaufman and Rock as not having achieved complete darkness (1962). They claimed to have found no moon illusion in the Hayden Planetarium. But Suzuki, using as his "moons" paired points of laser light to ensure complete darkness in the rest of the planetarium, reports finding a moon illusion in which horizontal pairs were seen as 1.3 times further apart than elevated pairs (Suzuki 2007).

For whatever it is worth, I report one bit of anecdotal evidence on the same theme. During the total solar eclipse of August 21, 2017—which was only partial in my part of the United States—I viewed the sun several times during the course of the morning through protective glasses that blotted out all objects but the sun itself. The sun struck me as noticeably smaller in diameter as it rose in the sky, despite there being no visible intervening objects at the lower elevations, but only a uniform field of gray.

Second, there is one great empirical stumbling block in the way of the apparent-distance theory. The theory claims that perceived terrain increases perceived distance, which in turn increases perceived size. The rub is that most observers report that the horizon moon appears *closer* than the elevated moon, not farther (Plug and Ross 1989: 20).¹¹ To deal with this objection, Kaufman and Rock resort to the following stratagem: the sight of intervening objects produces in us an unconscious impression of greater distance, which produces (via a forwards application of the size-distance hypothesis) a conscious perception of greater lunar size. The increased size of the moon then produces (via a backward application of the size-distance hypothesis) a conscious judgment of lesser distance. This has aptly been called the farther → larger → nearer theory.

Suzuki disparages this theory as a “double theory.” This charge would be unfair as a charge of Orwellian doublethink. The theory is perfectly consistent: an unconscious perception of greater distance gives rise to a conscious perception of greater size, which then gives rise to a conscious judgment of lesser distance. Conscious perceptions sometimes clash with unconscious ones, and a consistent theory may point this out. But the charge may be apt as a charge of ambiguity or equivocation. In the inference (or whatever be the process) that takes us from “farther” to “larger,” the conclusion (or output) is greater perceived *linear* size, which is then supposed to function as the premise or input in the second inference, from “larger” to “nearer.” But if you combine greater linear size with constant angular size, the conclusion should be *farther*, not *nearer*. The “larger, so nearer” inference must proceed from a premise or input of greater perceived *angular* size. The farther \rightarrow larger \rightarrow nearer theory does not work if the output of the first inference is not the same as the input to the second. Evidently, the theory requires perceived size to mean one thing as the conclusion of the first inference and another thing as the premise of the second. (For this criticism, see Plug and Ross 1989.¹²)

The distinction necessary for understanding the third problem has now been introduced. According to several investigators, the principal thing to be explained in the moon illusion is the greater perceived *angular* size of the horizon moon (McCready 1986; Plug and Ross 1989: 22; Suzuki 2007). But what is derivable from the size–distance invariance hypothesis seems just to be greater perceived *linear* size. The principal *explanandum* remains unexplained.

To sum up, there are three problems for the theory that invokes intervening terrain and apparent distance: the phenomenon can occur without any perceived terrain; one of the explanatory facts (greater perceived distance) may not be a fact; and the phenomenon explained may not be the right one.

Let us return to Berkeley’s explanation, that the horizon moon looks larger because it is fainter. Does his theory fare any better? The answer is no. The following problems for it may be cited:

- 1 The constellations are not appreciably less bright upon rising but do appear larger on the horizon, as was pointed out by Molyneux.
- 2 The Apollo astronauts reported an earth illusion, even though the moon has no atmosphere to make the earth fainter on rising.
- 3 The eclipsed moon and the moon by day are fainter but do not then appear larger.
- 4 As Ross and Plug note, under many circumstances, fainter objects actually appear *smaller* (Ross and Plug 2002: chapter 6).

Points (1) and (2) question the necessity of Berkeley’s *explanans*, points (3) and (4) its sufficiency.

Ross and Plug (2002) note that points (3) and (4) may not be fatal to Berkeley, since he observes in *NTV* (72 and 73) that the faintness cue is tied to particular circumstances. It is only faintness in objects placed more or less on a level with us, not high above us, that we have learned to associate with greater size.¹³ (When did we even learn even that, I wonder? I return to this question below.) But objections (1) and (2) remain, and they show that faintness is not a necessary part of the cause of the moon illusion.

Egan distinguishes two facets of any explanation of the moon illusion: it must identify the cue that makes us perceive the moon as larger, and it must identify the mechanism by which it does this. For Kaufman and Rock, intervening terrain is the cue, and computation (via the size–distance hypothesis) is the mechanism; for Berkeley, faintness is the cue and association the mechanism. Agreeing that Berkeley was wrong about the cue, she argues that he might have been right about the mechanism and therefore puts forth a hybrid theory in which intervening terrain (or “filled space” as she prefers to call it) is the cue and association the mechanism.¹⁴

I wish to suggest another mechanism, to the possibility of which Reid would have been keenly alert. Reid propounds a number of psychological laws to the effect that in such-and-such circumstances human beings respond with so-and-so beliefs or perceptions. One example is the law of visible direction, according to which if light from some point on an object strikes a point low on our retina, we will see the point as high in our visual field, projecting it as lying along a straight line passing from the point of stimulation through the center of our eye and out into ambient space.¹⁵ He puts this law forth simply as an inductively confirmed generalization by the cognitive scientist and offers no deeper explanation for it. In particular, he does not suggest that ordinary perceivers have discovered this law for themselves; they just operate in accordance with it, perhaps because it is part of their innate design plan to do so. And though he agrees with Berkeley that we perceive distance by sight only because we have learned how visual cues and distance are correlated, he also says in an unpublished manuscript that in principle we might have been so constructed that the cues in question served innately for us as signs of distance, with no need of our having to learn any correlations (MS 2131/8/II/21 in the Aberdeen University Library). It seems to be an in-principle possibility that anything we are capable of learning might also have been something we were innately programmed to operate in accordance with.

I come now to the option I wish to point out, if only as a region of logical space. Suppose Egan is right in suggesting that terrain is an important cue, and suppose she is also right in her criticism of computation as the mechanism. It does not follow that Berkeley is right in holding that the mechanism is association. Berkeley's associationism is not the only game left in town. It could simply be a law, propounded in a Reidian spirit, that when there is intervening terrain, objects look larger to us. Not because of computation and not because of association—the law just governs us, perhaps because of our hard-wiring or perhaps for reasons we do not yet know.

What is it to look large?

In the previous section we discussed rival hypotheses about the *cause* of our seeing the moon as larger on the horizon. But what is the phenomenon itself—what *is* it to see the moon as large? Perhaps this question should have come first. Strangely, neither Berkeley nor Reid has a good answer to this question—Berkeley has a wrong answer and Reid no apposite answer at all.

Reid equated apparent magnitude with angular size, but he also knew that the horizon moon looks larger than the elevated moon *despite* being of the same angular size. So he needs an account of what it is to look larger in whatever sense the moon looks larger in the moon illusion, but this he never gives us. Perhaps the astronomer's term "apparent magnitude" for "angular size" led him astray on this point—it may not have occurred to him that there might be a difference between "apparent size" and "apparent apparent size," that is, between angular size and perceived angular size.¹⁶

This brings us again to the distinction between perceived linear size and perceived angular size, first drawn according to Plug and Ross (1989) in McCready (1986). The distinction seems apt for sorting out some of the confusion in writings about the moon illusion. I must say, however, that I find it hard to know which variety of perceived size is involved in my own experience of the moon illusion. Now that the distinction has been pointed out to me, I would probably say I see the angular size as greater. Of course, I don't see the subtended angle "sideways on" as I would in a diagram of it, but McCready says it is manifest in the lines of direction along which I would point with my nose at end points of the moon's diameter.

I say it is probably angular size I see as greater partly because I do not have a good grasp on what perceived linear size is supposed to be. I do not think the moon *looks to be* linearly larger when near the horizon; that is, its appearance does not make me think that the moon really is more units across then. Perhaps it “looks the way a larger moon would look” in Chisholm’s comparative sense (Chisholm 1957: 44–53.). But I don’t know what looking that way would be if it is not a matter of seeming to have a larger angular size.

I turn now to Berkeley’s answer to the question of what it is to appear large. Berkeley realized that the horizon moon and the elevated moon have the same visible magnitude as he measures that quantity—they have the same number of visible points or minima (*NTV*, 78). Yet the horizon moon still appears larger in some sense. In what sense? Here is his answer: “When, therefore, the horizontal moon is said to appear greater than the meridional moon, this must be understood, not of a greater visible extension, but of a greater tangible extension which ... is suggested to the mind along with [the visible appearance]” (*NTV*, 74).

I find this suggestion phenomenologically incredible. When the horizon moon looks larger to me, I have no thought or impression whatever of any tangible attribute—no thought of hugging the astronomical moon, no thought of enclosing a silvery disk within my fingertips and feeling the distance between them proprioceptively, no thought of pressing my palm against an array of nubbly tangible points.

Let me be clear about the nature of my objection. Berkeley does not say that when something looks large to me, I *believe* that the associated tangible object is large. In some cases there may not even be a relevant tangible object, and I may know this. Consider the T illusion. If you draw a T on a blackboard with its vertical and horizontal bars each the same length as the eraser, the vertical bar will appear longer. Does that mean you believe that the tangible correlate of the visible vertical bar—a trail of chalk, perhaps—is tangibly longer than the correlate of the horizontal bar? Probably not; you can still get an experience of the T illusion from what you know to be the shadow of a T cast on no tangible surface. Tape a T onto the glass of a beacon and cast its shadow on the nighttime sky, as with the signal used to summon Batman. The vertical bar will again appear longer, but you may not believe that the two visible bars have tangible correlates in the sky. If you do believe they have tangible correlates—scattered particles of dust, perhaps—you may not believe that one of them is tangibly longer than the other. No; all Berkeley requires is that when something appears larger to you, a larger tangible correlate is suggested to you or brought to mind. But whether even this bringing to mind happens is what I question on phenomenological grounds.¹⁷

If Berkeley’s claim that fainter objects look larger means that fainter objects suggest larger tangible correlates, then the association that produces the moon illusion must be an association between faintness and greater tangible size. As he says in *NTV* (72), faintness of appearance, at least in a certain range of cases, “has been experienced to coexist with great magnitude.” But has anyone ever really experienced such a correlation? If objects are faint owing to such causes as intervening vapors intercepting the light, we are typically not close enough to them to touch them (or their tangible correlates). What about faint objects whose tangible correlates are within arm’s reach or only a few steps away—have we found that faintness in such objects is a sign of largeness? I doubt it. Put a Chinese lantern across the room from you and gradually dim the light with a remote switch. Does the dimmer object look any larger? Does the lantern itself feel any larger than it did on the bright setting? Perhaps I have stepped outside what Berkeley would consider the appropriate range of cases—but what is that range?

Enough has been said to show why I am skeptical about Berkeley's claim that the horizon moon looks large in an other-than-visual sense thanks to correlations we have learned between faintness and tangible size. Nonetheless, I am going to remain with this topic a little longer to bring out a further difficulty—a difficulty I think debilitating for many of the core contentions of the New Theory. Berkeley thinks many of the properties we attribute to objects on the strength of vision are really properties of tangible objects only, not given to vision but signified by properties that are given to vision or the visual system. We see that the fence is closer to us than the horse—that is, the visible fence occludes the visible horse, and from that we know that fewer steps are required to reach the tangible fence than the tangible horse. We see that one sunflower is taller than another—that is, one visible sunflower has greater visible magnitude than another, and from that together with our knowledge that the tangible correlates of the visible sunflowers are equidistant from us, we know that we would have to lay our hands down more times on one than the other in taking its tangible measure. We see that our walking stick stands upright in the corner—that is, because we have to turn our eyes upward to bring the visible knob into clear view, we know that we must reach high to grasp the tangible knob (the correlate of the visible knob). All of these cases raise the following question: what makes a given object $T(x)$ the tangible correlate of some visible object x ? The most obvious answer outside Berkeley's system would be that x and $T(x)$ occupy the same place—or perhaps even (as in Reid's system) that they are identical. But in Berkeley's system there is no common space inhabited by objects of sight and touch, and there is no distance, great or small, between any visible thing and any tangible thing (*NTV*, 112). So what does the correlation consist in? The “coexistence” Berkeley sometimes speaks of is woefully insufficient. Which of the hundreds of similarly sized and shaped apples on the tree is the tangible correlate of the visual apple on which I have my eye? Which one is it whose place in tangible space makes true my observation that a certain visible apple hangs lower than the rest on the tree? If Berkeley has an adequate answer, I do not know what it is.

In sum, neither Reid nor Berkeley has a good answer to the question what it is to look large (or for one thing to look larger than another). What would a good answer be? The question is too large for me to tackle here. I will only note one of the issues that must be addressed: whether looking large is an irreducibly sensory phenomenon or an intentional phenomenon, having to do with what propositional contents are represented as being true.¹⁸

Notes

- 1 I cite the *Essay Towards a New Theory of Vision* as *NTV*, the *Principles of Human Knowledge* as *PHK*, the *Dialogues between Hylas and Philonous* as *DHP*, Reid's *An Inquiry into the Human Mind on the Principles of Common Sense* as *IHM*, and his *Essays on the Intellectual Powers of Man* as *EIP*.
- 2 Some may regard my short answer as contradicted by Berkeley's longer answer, that we see distance mediately by the mediation of visual cues. But witness: “Those things alone are actually and strictly perceived by any sense, which would have been perceived, in case that same sense had then been first conferred on us. As for other things, it is plain they are only suggested to the mind by experience grounded on former perceptions” (1975: 194). Earlier in the same speech, Philonous says that things perceived only mediately are not perceived “in truth and strictness.” In *NTV* (50), he says that distance is seen by the eye only in the sense in which another's thoughts are heard by the ear.
- 3 Margaret Atherton (1990) has distinguished three notions that she claims many commentators on Berkeley conflate: distance, depth (or bulginess), and outness. I will explain the differences among these three in my own way. Distance is a *metric* concept; one sees or knows the distance of something iff one sees or knows how far away it is. Depth is a *comparative* concept; something looks bulgy or to have depth iff it looks as though some of its parts are closer than others. Outness is an *absolute* or *qualitative* concept; something looks to be “out there” iff it looks to be some distance away, though not

- any distance that one could either measure or compare with others. (Whether “out there” should be taken to have connotations of mind-independence is a separate issue, addressed by Berkeley in *PHK* [42].) Atherton claims that Berkeley is concerned in the *NTV* exclusively with the first of these, metric distance—that is what we do *not* perceive immediately and what we *do* perceive mediately by the mechanisms Berkeley sets forth. I disagree. I think Berkeley holds we do not perceive *any* of the three features immediately. For one thing, the “one point” argument of *NTV* (2), if it shows anything, would show that we do not see even outness, for a point at some distance and a point at no distance would both make the same impression on the retina. For another, Berkeley says this about a man born blind and made to see who has not had the opportunity to develop any of the mechanisms explained in Berkeley’s theory: the sun and stars and all objects intromitted by sight “would seem to him (as in truth they are) no other than a new set of thoughts or sensations, each whereof is as near to him, as the perceptions of pain or pleasure, or the most inward passions of his soul” (*NTV*, 41). Let me point out as well that not even stereopsis, the most powerful mechanism of depth perception known today, gives us any more than comparative distance or depth.
- 4 Reid’s terminology is taken from the astronomy of the day. The apparent magnitude of a star is the angle it subtends at the eye or telescope of the observer.
 - 5 For example, Berkeley says the upright posture of a thing is properly a tangible feature only, signaled by various properties of distinct visual objects associated with it (*NTV*, quadrant 3). Reid says that when he holds his walking stick with its knob above the horizon, he sees and feels the same object and is aware that its knob is both visibly and tangibly above its tip (*IHM*, 6.11, 119).
 - 6 The other puzzle cases are the now not-so-famous Barrow problem for distance, the problem of how we manage to see things right-side up with inverted retinal images for orientation, and Molyneux’s question—would a newly sighted man recognize by sight shapes he knew previously by touch?—for the relation of visual to tangible objects.
 - 7 Among the psychological theories still in contention that I do not discuss here are theories according to which the perception of greater size is due to the angle of the eyes or head, the presence of objects on the horizon with whom the moon’s size is compared, and the state of accommodation within the eye. See Ross and Plug 2002 for discussions of them all.
 - 8 This is a matter of sheer geometry if you assume a ring of atmosphere around the earth of uniform height and density. A line passing through this ring sideways or at any oblique angle will be longer than one passing through it straight up. (Which implies, by the way, that the moon will steadily decrease in faintness all the way up on its ascent to the zenith. So on the theory of Berkeley’s about to be described, should it not decrease in apparent size all the way up, contrary to fact? I return to this difficulty below.)
 - 9 It had been supported by Kepler, Descartes, Malebranche, and John Wallis (Plug and Ross 1989: 19). Berkeley cites Wallis in *NTV* (75–77).
 - 10 Suzuki cites his own work and that of others as showing that binocular viewing contributes to the moon illusion (Suzuki 2007).
 - 11 In two experiments reported by Egan, 116 out of 120 subjects said the horizon moon looks closer (1998: 609). This fact is a problem for Berkeley, too, since he claims that the faintness of the horizon moon is a cue of greater distance as well as greater size.
 - 12 Egan raises a somewhat different objection to Kaufman and Rock’s more recent presentation of their position. Noting that by “registered distance” they say they mean whatever sensory information is correlated with apparent distance, she observes that this could with as much right have been called “registered size.”
 - 13 This point addresses the objection I raise in note 7.
 - 14 “Terrain” is something of a misnomer, since sailors get the moon illusion over an expanse of ocean. What matters for Egan is just “filled space,” which is present for the sailors but absent between us and the elevated moon (or between airplane passengers and the horizon moon). Kaufman and Rock seem to have a similarly liberal view, speaking in one place of “merely a plane extending outward from the observer.”
 - 15 This is a key part of Reid’s explanation of why we see objects erect despite having inverted images of them. See *IHM* 6.12, 122–123 and Van Cleve (2015: chapter 7, section D, esp. 206–207), for further discussion.
 - 16 See McCready (1986) for a similar suggestion, though not applied to Reid in particular.
 - 17 Even if it does happen, not all cases in which something that is not really there is brought to mind are cases of *illusion*. If smoke and fire have been conjoined in my experience, the sight of smoke rising

above a distant ridge may bring to my mind the idea of an unseen fire on the other side. If this time the smoke is really dust and there is no fire, I have not had the *illusion* of fire; I have not even had an appearance of it.

- 18 A good entrée to the issue is provided by Chapter 1 of Peacocke (1983), which has stimulated a good deal of discussion. Peacocke offers a series of examples in which he thinks the spatial character of certain experiences, including one tree's looking larger than another, can only be understood as a sensory and not a representational characteristic.

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13

INFORMED BY “SENSE AND REASON”

Margaret Cavendish’s theorizing about perception

Deborah Boyle

Margaret Cavendish (1623–1673) frequently criticized her philosophical contemporaries for their hubris in thinking that their laboratory instruments could help them discover fundamental truths about Nature; she lamented that microscopes and telescopes were merely “superficial wonders” that had “intoxicated so many men’s brains” (Cavendish 2001: 51). Indeed, even if these instruments did seem to reveal truths about the inherent natures of objects, Cavendish would still have been wary of asserting that we could know these truths with certainty. Even our most reasonable beliefs provide only “the Probability of Truth” (Cavendish 1663: c4v) and “can never attain to a Perfect knowledge” (1663: 132). Thus Cavendish characterized her own natural-philosophical reasoning—and that of other philosophers—as probable “opinions”; indeed, she called two of her books *Philosophical and Physical Opinions*, and the subtitle of her *Philosophical Letters* is “Modest Reflections upon some Opinions in Natural Philosophy.” “Natural philosophy,” she writes, “is no more but a rational inquisition into the causes of natural effects, and therefore, as we observe the effects and actions of Nature, so we may *probably guess* at their causes and principles” (Cavendish 2001: 158; emphasis added).

Nonetheless, Cavendish did think some opinions were more reasonable than others, and she maintained that the best guide for discovering what is most probably true in natural philosophy is what she called “regular sense and reason.”¹ While this phrase appears repeatedly in Cavendish’s works, she never explains what this method amounts to. However, one method Cavendish often uses is something like inference to the best explanation, and so this may be what she mean by “regular sense and reason.” Cavendish’s approach may be more aptly called “inference away from a bad explanation,”² however; when she reasons in this way, she considers the explanatory strength of some theory that others have proposed, judging that theory to be *less* probably true than another to the extent that it *fails* to predict some natural phenomenon that we *do* experience, and *does* predict some phenomenon that we do *not* experience. We can see this strategy as being a method of “sense and reason” because reason enables us to see what the theory should or should not predict, while sense perception informs us of the phenomena that do in fact occur.

One example of Cavendish's employment of this method is the way she argues in her mature work against atomism. To be sure, as Karen Detlefsen has pointed out, Cavendish does argue that atoms are conceptually incoherent (Detlefsen 2006: 204). But she also argues that if atomism were true, there would be a "horrid confusion in nature" (Cavendish 2001: 129). Since we observe order rather than confusion, this is a point against atomism.

Another topic on which Cavendish employed this inferential strategy was sense perception itself. She was especially concerned to show the inferiority of Hobbes's account of sense perception to that of her own. By 1664, when she wrote *Philosophical Letters*, she had read Hobbes's *Leviathan* and *De corpore*, and she thought the mechanistic account of sense perception laid out in these texts failed her test of "sense and reason." As Hobbes wrote in *Leviathan*:

The cause of Sense, is the Externall Body, or Object, which presseth the organ proper to each Sense, either immediatly, as in the Tast and Touch; or mediately, as in Seeing, Hearing, and Smelling: which pressure, by the mediation of Nerves, and other strings, and membranes of the body, continued inwards to the Brain, and Heart, causeth there a resistance, or counter-pressure, or endeavour of the heart, to deliver it self: which endeavour because Outward, seemeth to be some matter without.

(Hobbes 1994: 6)³

Following Marcus P. Adams, I will call this the "pressure model of perception," or PMP (Adams 2016). In *Philosophical Letters* and other texts, Cavendish offers at least nine different objections to PMP, which collectively show (according to Cavendish) that Hobbes's theory is unlikely to be true. Each objection takes the form of a claim, either a claim that if PMP were true then some class of perceptual phenomena that we *do* experience to occur should not actually occur, or a claim that if PMP were true, then we would expect some class of phenomena to occur which clearly does *not* occur. Collectively, the objections are meant to show that PMP does a poor job explaining sense perception. In contrast, she believed that her own account of sense perception *could* explain our experiences in sense perception, and did *not* predict any consequences that we do not experience.

Before examining how Cavendish appeals to ordinary perceptual phenomena to argue that PMP is unacceptable, it will be helpful to sketch Cavendish's own alternative theory of sense perception and how it fits into her broader natural-philosophical system. After undertaking this preliminary project, I turn to her objections to Hobbes (and some criticisms of her objections), ending with what I think are some unresolved problems for her theory of sense perception.

Cavendish's natural philosophy

Cavendish was a materialist in so far as she held that the infinite, eternal universe is composed only of matter; immaterial spirits might exist but only in some supernatural realm, not as part of the natural world. But Cavendish's materialism was unusual, for she held that all matter is self-moving, and not (as Descartes and Hobbes had claimed) inert and passive. Moreover, Cavendish held that this matter is perceptive and knowing. Everything in nature has some kind of perception and knowledge, even if we cannot understand how things like rocks and plants perceive.

While Cavendish insisted that there is just one kind of matter comprising the universe, she also maintained that this matter comes in what she called three "degrees." Two of these degrees are animate, and one is inanimate. Within the category of animate matter, she made a further distinction, between the rational animate matter and the sensitive animate matter;

these she refers to simply as "rational matter" and "sensitive matter." Although the three degrees have different characteristics, Cavendish held that they are entirely intermixed. As she put it in her 1666 book, *Observations upon Experimental Philosophy*:

Nature is an infinite composition of rational, sensitive, and inanimate matter: which although they do constitute but one body, because of their close and inseparable conjunction and commixture; nevertheless, they are several parts (for one part is not another part) and therefore every part or particle of nature, consisting of the same commixture, cannot be single or indivisible.

(Cavendish 2001: 127; see also 157)

Since the three degrees of matter are completely blended into what Cavendish called a "co-mixture," any given bit of matter, if further subdivided, will contain all three degrees. Moreover, this matter is a continuous plenum and is infinitely divisible; no part is actually separable from the rest, and no bits of matter can "subsist single, or by themselves, precised or separated from all other parts" (Cavendish 2001: 126).

This blended, continuous matter that makes up Nature is in constant motion, with an infinite variety of different motions. Cavendish writes, "Nature is a perpetually self-moving body, dividing, composing, changing, forming and transforming her parts by self-corporeal figurative motions" (2001: 85).

And it is because of this variety of motions that we see a variety of types of creatures:

[N]ature being various, not only in her parts, but in her actions, it causes a variety also amongst her creatures; and hence come so many kinds, sorts and particulars of natural creatures, quite different from each other; though not in the general and universal principle of nature, which is self-moving matter.

(Cavendish 2001: 221)

Thus, Cavendish thought that although Nature is indivisible in the sense that no bit of matter can ever be truly *detached* from the rest, we can nonetheless speak of "parts" in Nature. Nature is delineated into different entities by the variety of her motions, or what Cavendish calls "figures." These different entities include creatures like people, trees, cats, rocks, and so on, as well as the smaller parts of these entities (eyes and hands, branches and limbs, particular minerals, for example), and the smaller particles of which those parts are composed.⁴ Each entity is of some type or species, each type being characterized by certain characteristic motions or "figures." As she wrote in her 1668 *Grounds of Natural Philosophy*, "Nature's Wisdom orders and regulates her Corporeal Figurative Motions, into kinds and sorts of Societies and Conjunctions" (Cavendish 1668: 32). For example, members of the natural kind "cat" are particular associations of bits of the blend of rational, sensitive, and inanimate matter, associations in which the rational and sensitive matter moves in ways that are characteristic of cats. These characteristic motions of a given type of entity make up the nature of that type of entity (Cavendish 2001: 197).

Moreover, Cavendish had a teleological conception of nature. She often characterized nature using metaphors that suggest purpose: Nature is like a "wise and provident lady" in charge of her household (Cavendish 2001: 105), and Nature's "Wisdom...orders and regulates her Corporeal Figurative Motions" into various kinds (Cavendish 1668: 32). Nature's goal is for matter to be orderly, and to be orderly, according to Cavendish, is for each part in nature to move according to the motions that are "proper" to its kind. As she put it, "every

Creature, if regularly made, hath particular motions proper to its figure” (Cavendish 1664: 184); and, again, “each part must have such proper and natural motions and actions as nature has designed for it” (Cavendish 2001: 64). This means that there are “natural rules,” or norms, for how the matter in a given type of creatures should move (Cavendish 1668: 246–247). For example, the internal motions of the matter that makes a cat are such that cats are small four-legged furry mammals that grow and develop in a certain characteristic way and respond to stimuli in characteristic ways—they purr when petted, chase small moving objects, and so on. These are the motions that are “proper” to the kind “cat.” If a cat does not behave in a way that is characteristic of cats, then, Cavendish would say, the motions of the matter comprising the cat are *irregular*. Irregular motions are those that “move not after the ordinary, common, or usual way or manner” (Cavendish 1664: 360).

Cavendish took her claim that both rational and sensitive animate matter are self-moving to entail that matter is always moving, and never at rest (Cavendish 2001: 268), and that causal connections between objects in nature are not to be explained mechanistically. As Cavendish read mechanists like Descartes and Hobbes, when one object A causes a change in another object B, object A is active, transferring some of its motion to object B, which is passive. Cavendish presented, instead, a model of occasional causation. A body A serves as the occasional cause of a change in another body when the second body, B, responding to some action performed by A, produces the appropriate change in itself. She gives an example of a watchmaker setting a watch in motion:

A Watch-maker doth not give the watch its motion, but he is onely the occasion, that the watch moves after that manner, for the motion of the watch is the watches own motion, inherent in those parts ever since that matter was...Wherefore one body may occasion another body to move so or so, but not give it any motion, but every body (though occasioned by another, to move in such a way) moves by its very own natural motion.

(Cavendish 1664: 100)

As Karen Detlefsen has observed, this account differs from the occasionalism that Malebranche was later to endorse. In occasionalism, God is the cause of effects in the natural world; in Cavendish’s account of occasional causation, God plays no role (Detlefsen 2007: 166).

Detlefsen has suggested that Cavendish’s account of occasional causation requires that she ascribe a libertarian free will to matter, for otherwise a bit of matter would not be able to respond to external objects through its own *self*-motion (Detlefsen 2007: 182–183). There is some debate in the secondary literature about whether Cavendish’s account of occasional causation requires this, but a discussion of this question would take us too far afield.⁵ Assuming that the libertarian reading is correct, then Cavendish’s view is that when one object A causes a change in a second object B, it is the self-moving matter of object B that *freely chooses* to move in a way that responds to the motion of object A. In other words, causal connections are not necessary connections.

Recall that Cavendish considered natural kinds to be distinguished by characteristic motions, motions that are proper and appropriate for that kind. Now we can say that when an object A acts in a way that should, according to the natural rules for objects of type B, result in object B acting a certain way, and object B does indeed respond that way, object B is freely choosing to follow the rules for the type of entity that it is. But this also leaves open the possibility that object B might choose not to follow those rules; object B might choose to

act irregularly. As Cavendish put it, “All Creatures may have some Natural Rules; but, every Creature may choose whether they will follow those Rules” (1668: 246–247).

Detlefsen has also pointed out that Cavendish’s theory of occasional causation requires the view that all parts of Nature are perceptive, so that they may sense what is happening in the bodies around them in order to respond. This is true not just of entities that we typically take to be perceptive—humans and other animals—but also of plants, minerals, and parts of these entities. Cavendish realized that most people would resist ascribing perception to any creatures other than humans, but she saw this as due only to a self-interested wish to elevate humans above the rest of the natural order (Cavendish 2001: 112). As she writes in *Philosophical Letters*:

Though every kind or sort of Creatures has different perceptions, yet they are not less knowing; for Vegetables, Minerals, and Elements, may have as numerous, and as various perceptions as Animals, and they may be as different from animal perceptions as their kinds are; but a different perception is not therefore no perception.
(Cavendish 1664: 519)

As Detlefsen points out, Cavendish’s attribution of perception to all the parts of nature plays a key role in her account of causation, for “The causal efficacy among natural bodies takes the form of bodies *sensing* others around them and *knowing* how to react to these other bodies or rationally *suggesting* to another how to act” (2007: 168). In sum, Cavendish’s theory of occasional causation seems to require that all parts of matter, whether large and small, possess both free will and perception. Cavendish’s account of perception is taken up in the next section.

Sensitive and rational perception as patterning

Perception is one of two fundamental kinds of knowledge in Cavendish’s epistemology; the other is self-knowledge. Perception is “an exterior or foreign knowledge; that is, a knowledge of other parts, figures or actions,” while self-knowledge is a kind of “interior” knowledge (Cavendish 2001: 163).⁶ She also explicitly distinguishes between sensitive perception and rational perception, and, while she does not explicitly distinguish types of rational perception, her texts indicate that the phrase “rational perception” characterizes two different kinds of mental process. I will elaborate on these three distinctions in turn.

First, consider how Cavendish distinguishes self-knowledge from perception. Self-knowledge is not directed at external objects; it is “interior and inherent” (Cavendish 2001: 138) and “innate and fixt [*sic*]” (2001: 16). It is possessed by all matter, both animate and inanimate (2001: 156). Although Cavendish offers only scattered remarks on self-knowledge, it seems to include three components. First, it includes knowledge of the existence of God (Boyle 2018: 106–108). Second, the self-knowledge of some bit of matter includes knowledge of what that bit of matter is *currently* doing: Cavendish writes that “every part and particle has a particular and finite self-motion and self-knowledge, by which it knows itself, and its own actions” (2001: 138). Third, it includes knowledge of what that bit of matter *should* be doing. As we saw earlier, Cavendish thinks that each type of entity has certain characteristic, “proper” motions. Knowledge of these appropriate motions is part of an entity’s self-knowledge (Cavendish 1668: 53–54).

In contrast to self-knowledge, perception “extends to exterior objects” (Cavendish 2001: 138) and is possessed only by the two animate degrees of matter. That is, it is through perception that parts of Nature learn about objects outside themselves. Humans typically have five sensory modalities; interestingly, Cavendish insists that all other parts of Nature are also able to perceive

objects external to themselves, even if they do not have sense organs such as eyes or ears. As she puts it, she cannot believe that “man is a Monopoler of all Reason, or Animals of all Sense, but that Sense and Reason are in other Creatures as well as in Man and Animals” (1664: 43).

Cavendish explains perception, at least in humans, by appeal to a process she calls “patterning” or “imitation.”⁷ Recall that she thinks that beings of different types are distinguished by their different motions. When some item is present to the senses, the sensitive matter in the sense organ of the perceiver copies, imitates, or, as she puts it, “pencils” or “figures out” the motions of the object being perceived (Cavendish 1664: 81). She gives an example of someone seeing a piece of embroidery:

As for example, there is presented to sight a piece of Imbroydery, wherein is silk, silver and gold upon Sattin in several forms or figures, as several flowers, the sensitive motions straight by one and the same act, pattern out all those several figures of flowers, as also the figures of Silk, Silver, Gold, and Sattin, without any pressure of these objects, or motions in the medium.

(Cavendish 1664: 68)

Here Cavendish describes how the sensitive matter in the eye responds to the presence of an external object, the piece of embroidered silk. The eye’s perception of the embroidered silk is constituted by the motions in the sensitive matter as it copies the motions of the matter that comprises the piece of silk.⁸ It is important to note that, as Kourken Michaelian puts it, “Perception is not a consequence of patterning but the activity of patterning itself” (Michaelian 2009: 40).

Corresponding to the two degrees of animate matter (the sensitive and the rational), Cavendish distinguishes between two types of perception: every object in Nature possesses a “double perception” (1664: 19, 115; 1668: 9; 2001: 144).⁹ This brings us to her second distinction, between sensitive and rational perception. In normal cases of a person consciously perceiving some external object in her vicinity, sensitive and rational perception work together. The basic picture is this: the sensible matter in, say, a human eye, copies the exterior motions of some object—say, an apple. Rational matter in the eye can copy motions, too—not the motions of the apple itself but the motions of the sensitive matter that patterned out the apple. When rational matter does this, then there is “rational perception” (in one sense in which Cavendish uses that phrase) of the apple.

Cavendish is not entirely clear regarding what additional purpose is served by rational perception when sensitive perception has also occurred. David Cunning has suggested that rational perception results in the creation of *ideas*. He writes that, for Cavendish, “sensory perceptions are in general veridical and tend to be accompanied by the formation of *ideas*” that are copies of the sense perception (Cunning 2016: 35; my emphasis). On this reading, Cavendish equates a “rational perception” with “idea.” However, Cavendish herself very seldom uses the language of “ideas.” In *Observations*, she only uses the word “idea” when responding to the views of others (see Cavendish 2001: 88); in *Grounds of Natural Philosophy*, she does not use the word at all. Instead, Cavendish talks about perceiving, knowing, conceiving, imagining, opining, remembering, reasoning and so forth (Cavendish 1668: 59). That is, her epistemology focuses on mental *actions*. When she refers to a “perception” or “conception,” she is referring to *motions* in animate matter, to *actions* performed by animate matter (Cavendish 1668: 58–59). So in accounting for the role of rational perception, we should look not to its role in creating some additional entity like an “idea” but to its role in the act of thinking.

One hint regarding its role occurs in Cavendish's description of a case when sensitive perception occurs *without* rational perception. She gives an example of someone who is so engrossed in reading that she does not feel someone pinching her (Cavendish 2001: 150; see also 1663: 292–293). In this example, the person *does* have a sensitive perception of the pinch, for Cavendish refers to "the actions of the sensitive spirits," and patterning actions by sensitive spirits just are cases of sensory perception. Yet, since rational matter does not copy the sensitive spirits' actions, the person does not feel the pinch. Cavendish seems to be suggesting that *conscious* sensory perception requires both sensory perception (sensitive matter patterning out the motions of the object) and rational perception (rational matter patterning out those motions of the sensitive matter).¹⁰

Cavendish also suggests another role for rational perception when it occurs in concert with sensitive perception. As Kourken Michaelian points out, Cavendish seems to hold that rational perception "plays a sort of integrative role" regarding sensitive perception (2009: 42; see also James 1999: 232), for she says that rational perception is more "generally perceptive" than sensitive perception: "the Rational parts can make a Whole Perception of a Whole Object: Whereas the Sensitive makes but Perceptions in part, of one and the same Object" (Cavendish 1668: 9). In patterning out the diverse motions of the sensitive matter—which may include motions of the eye, ear, and other sense organs as they copy the motions of the external object—the motions of the rational matter unite those patterns so that the object is perceived as one. In perceiving a candle, for example, Cavendish notes that the perceiver perceives the flame, light, and color and shape of the candle as the sensitive matter in the eyes patterns them out; the "Ear patterns out the sparkling noise, the Nose patterns out the scent of the candle; and the Tongue may pattern out the taste of the candle" (Cavendish 1668: 55). According to the interpretation suggested by Michaelian it is rational matter's patterning out all those motions of the sensitive matter together that constitutes the person's conscious perception of the candle as *one being*.

The pinching example mentioned earlier shows that, for Cavendish, sensitive perception can occur without rational perception. She also holds that rational perception can occur without sensitive perception. In such cases, the rational matter voluntarily "figures" itself in ways that pertain to an external object but that do not copy any occurrent motions of the sensitive matter (Cavendish 1663: 92). This process is constitutive of remembering, conceiving, imagining, supposing, understanding, reasoning, opining, musing, and other like mental states (Cavendish 2001: 150 and 170). Cavendish's texts thus support ascribing a third distinction to her, between two senses of "rational perception." First, "rational perception" can refer to the process already discussed, whereby rational matter patterns out the motions of sensitive matter when that sensitive matter is itself—at that very moment (Cavendish 1668: 57)—patterning out some external object. Second, it can refer to any process of the "rational parts" "figuring" themselves in ways that pertain to an external object but do not copy any occurrent motions of the sensitive matter (although they may copy motions that had previously occurred in the sensitive matter).

Objections to Hobbes' pressure model of perception

Cavendish's account of human perception as patterning was intended as an alternative to PMP, Hobbes's mechanistic theory of perception in terms of pressure. Cavendish's alternative account of perception does agree with PMP in one respect, which is that sense perceptions are constituted by motions. Her disagreement is with the claim that these motions are caused by *pressure*. She offers numerous objections to PMP, each taking the form either of a claim

that if PMP were true, then some class of perceptual phenomena that we *do* experience to occur should not actually occur, or of a claim that if PMP were true, then we would expect some class of perceptual phenomena to occur which clearly does *not* occur. There is, thus, a poor fit between the theory (PMP) and the evidence (what we experience in perception). In *Philosophical Letters*, she mentions nine classes of perceptual phenomena that exhibit this poor fit with PMP:

- 1 perceptions themselves;
- 2 perceptions of things at a distance;
- 3 the tremendous variety of sensory perceptions;
- 4 perceptions of a given object being unchanged even when other nearby objects move;
- 5 the sense organs not being injured by perception;
- 6 sense perceptions fading or “decaying” over time;
- 7 people in a swoon not perceiving anything;
- 8 perceptual errors;
- 9 perceptions of objects through instruments like telescopes and microscopes appearing distorted, or as bigger or smaller than they really are.

Perceptions themselves

The very existence of sense perceptions indicates that Hobbes’s PMP is an unacceptable theory, Cavendish argues. This is because if, as Hobbes claimed, the pressure caused in the brain by external objects is counteracted by a “resistance and reaction,” motion in the brain would stop. And since she and Hobbes both hold that perception requires motion, this means that, by his own lights, perception would be impossible. She writes that:

If there were any Resistance, Reaction or Indeavour in the organ, opposite to the Endeavour of the object; there would, in my opinion, be always a war between the animal senses and the objects, the endeavour of the objects pressing one way and the senses pressing the other way, and if equal in their strengths, they would make a stop, and the sensitive organs would be very much pained.

(Cavendish 1664: 60)

She compares the Hobbesian model of pressure and reaction in the brain to a crowd of people, concluding that “there would be but little or no motion, for the crowd would make a stoppage” (Cavendish 1664: 32). Since PMP predicts, contrary to our experiences, that there would be no perception, PMP cannot be the best—or indeed any—explanation of our perceptions.

Hobbes could reply, however, that Cavendish’s objection assumes that the resistance in the body and the pressure caused by the sensed object would be “equal in their strengths.” However, as Leijenhorst notes, Hobbes evidently understood the “endeavour” exerted by a body resisting pressure from another body as “Motion made in less space and time than can be given; that is, less than can be determined or assigned by exposition or number; that is, motion made through the length of a point, and in an instant or point of time” (Hobbes 1839: 206; quoted in Leijenhorst 2002: 200).

Since Hobbes evidently does not assume that the motion constituting the resistance of the human body in sense perception is equal to the motion impressed in sense perception, then Cavendish’s objection falls short.

Perceptions of things at a distance

According to PMP, sense perception occurs through "impression and reaction," yet, Cavendish says, "I cannot in my simplicity conceive it, how bodies that come not near, or touch each other, can make a figure by impression and reaction" (1664: 80). Cavendish is aware that the mechanist would reply that the sense organs are affected by the motions of an object at a distance because of the motions of the intervening light, air, or other medium, but she finds this explanation unpersuasive: PMP would require that motions of the light or air press on the sense organs but because light and air are "so soft and rare" they could not have an impact on harder bodies (Cavendish 1664: 81). However, as Leijenhorst observes, "In general, Hobbes' explanation of physical phenomena omits the material makeup of insensible particles. Hobbes is only interested in motion itself, not in the nature of the material object that is affected by it" (2002: 189). Again, then, Hobbes would have a ready reply to Cavendish's objection: the softness or hardness of a body has no bearing on whether or not its motions can impact another body.

The tremendous variety of sensory perceptions

Cavendish writes, "If these figures were made by the pressure of several objects or parts, and by reaction, there could not be such variety as there is, for they could but act by one sort of motion" (1664: 81–82). Cavendish is here depending on another assumption about mechanism, that it posits only one kind of motion. She accuses Hobbes of limiting motion to "pressing forward and backward" (1664: 80), and in *Observations* she criticizes Descartes for reducing all motion to "a whirling motion, or a spherical rotation" (1664: 74). Since PMP only allows a limited variety of motions, then, Cavendish argues, it predicts that there would be a very limited range of effects, and so only a limited range of perceptions. Indeed, it is one of Cavendish's objections to mechanism more broadly that it cannot explain the variety of entities, and the varieties of their qualities, in nature (Cavendish 2001: 55), so this objection to PMP is a special case of that argument. Cavendish tends simply to assert that there is variety in perceptions rather than to give examples of this variety, but, at the very least, she means that different creatures have different kinds of perceptions (Cavendish 1668: 18)—for example, bats, but not humans, perceive using echolocation. She may also mean that among the perceptions of a particular type of creature, and indeed among the perceptions due to a particular sense modality, there is tremendous variety. For example, research published in 2014 estimated that humans can detect up to a trillion different odors (Bushdid et al. 2014: 1372), evidence that Cavendish would surely take to vindicate her claim that perception is tremendously varied.

Perceptions of a given object being unchanged even when other nearby objects move

Cavendish says that if vision were the result of light moving and pressing the air (in turn moving and pressing the eye), then our vision should be constantly disturbed when *other* objects move and press the air. If PMP were the case, she says, "then the air must not move to any other motion but light, and only to one sort of light, as the Sun's light; for if it did move in any other motion, it would disturb the light" (Cavendish 1664: 82). Of course, moving objects do sometimes "disturb" light, in so far as they cast shadows, but what Cavendish means is that if vision were the result of motions of the air caused by light, then

any *other* cause of motion in the air, such as a bird flying, should interfere with the motion of the light, so we would expect to see light constantly dimming and altering as other things move about, which does not occur. The only option available to the advocate of PMP, Cavendish suggests, is to hold that air can *only* be moved by light, another claim that is not borne out by experience.

The sense organs not being injured by perception

Just as constant pressure between two external objects sooner or later causes physical changes in one of those objects, external objects being perceived would, if PMP were true, “cause such dents and holes [in the sense organs and brain], as to make them sore and patched in a short time” (Cavendish 1664: 22); the sense organs in the perceiver would “take a great deal of hurt,” and the perceiver would “at last be pressed to death” (Cavendish 1664: 60). Ears subject to loud music would “grow sore and bruised with so many strokes” (Cavendish 1664: 72). Eyes seeing by the sun’s light would be in “as much pain as Fire doth, when it sticks its points into our skin or flesh” (Cavendish 1664: 63). Injuries to ears and eyes do sometimes happen, of course, so Cavendish is not on such firm ground here. But she also observes that even a pleasant sound would become painful if continued for a “good while” (Cavendish 1664: 72). Since we do not suffer the kinds of injuries that PMP would lead us to expect, that is a strike against it.

Sense perceptions fading or “decaying” over time

Hobbes had claimed that the motions in the brain that constitute a certain sense perception start to “decay” after the object being perceived is removed, and that memories are these decaying, fading sense perceptions (Hobbes 1994: 8–9). Cavendish argues, however, that if perception were caused by pressure, then perceptions could *not* decay or disappear; once an impression or dent has been made, it will remain there until some other force presses it out (Cavendish 1664: 22–23). Here, Cavendish seems simply unfair to the mechanist, who could surely say that indeed some other force *does* press out the earlier impression. Indeed, Hobbes says precisely that: “for the continual change of man’s body destroys in time the parts which in sense were moved” (Leijenhorst 2002: 90, citing Hobbes 1994).

People in a swoon not perceiving anything

If PMP were true, then people who have fainted should still be able to see, hear, taste, smell, and touch, because being in a swoon would not stop external objects from pressing on a person’s sense organs; however, Cavendish writes, “all the time he is in a swoon, the pressure of the objects is made without any effect” (1664: 61). This objection is akin to the objection that if perception is due to no more than pressure, all *objects* should be able to perceive. Cavendish does not make this latter objection, presumably because, since she *does* in fact think that all objects can perceive, this would, by her lights, be no counterargument to PMP. Indeed, Cavendish’s panpsychism requires ascribing sense perception even to the person who has fainted; as in the pinching case mentioned earlier, however (see Cavendish 2001: 150 and Cavendish 1663: 292–293), she would explain the person’s unconscious state by saying that the rational matter is not copying or patterning the motions of the sensitive matter. Thus, Cavendish can, consistently with her own system, appeal to this sort of example.

As Stewart Duncan points out, Hobbes was attuned to the threat of the objection that PMP might entail that everything can sense, and this motivated Hobbes’ requirement of memory for sensation, a solution widely held to be unsuccessful.

The central problem is that memory, like the basic sense that is just reaction, or indeed like judgment, must be characterized in terms of a certain sort of motion. But whatever abstractly characterized sorts of motions are said to be memory, those same sorts of motions will almost certainly be found elsewhere in the world, and certainly could be.

(Duncan 2012: 393; see also Leijenhorst 2002: 98)

Cavendish’s objection thus does pose a challenge to PMP.

In all the classes of phenomena so far described, Cavendish thinks her patterning account of perception offers more plausible explanations. Patterning does not occur through contact, so perception at a distance is unproblematic; the variety in perceptions is explained by the ability of animate matter to move in infinitely many ways; perceptions are unperturbed by external motions because they are not caused by those external motions in the first place; many people can perceive the same thing because the animate matter in multiple perceivers can form their own copies of the one external object (Cavendish 1663: 299); perceptions can change by the animate matter reconfiguring itself (Cavendish 1664: 25, 89); and people in a swoon do not perceive anything because the animate matter is moving irregularly rather than engaging in any patterning motions (Cavendish 1668: 120–121). In each case, Cavendish has identified a flaw with PMP and offers a replacement explanation in terms of patterning.

There are (at least) two other classes of perceptual phenomena that Cavendish thinks can be better explained by patterning: (1) perceptual errors, and (2) the distorting effects of lenses. It is unclear that she has grounds for complaining that PMP cannot explain these cases, however. I consider each of them in turn.

Perceptual errors

Writing specifically about vision, Cavendish writes, “Neither do all eyes pattern out all objects exactly: which proves that the perception of sight is not made by pressure and reaction, otherwise there would be no difference, but all eyes would see alike” (1664: 85). She makes a similar point in her example of two men looking at each other from a distance, where the visual perception of one man is much better than that of the other; she concludes that “if perception were made by pressure, there would not be any such mistakes” (1664: 20). In a recent paper discussing the two-man example, Marcus Adams writes that

two persons perceiving each other, or perhaps two individuals perceiving the same object, should both perceive with the same degree of clarity since *only the pressure from without* would determine how clearly an object is perceived (and since she seems to consider Hobbesian visual perception as passive, this pressure would be equal for both perceivers).

(Adams 2016: 200)

Cavendish can easily explain perceptual errors in terms of the patterning motions of self-moving matter: mistakes in perception occur when something goes wrong in the patterning. As Michaelian points out (2009), there are two ways this can happen. First, the patterning motions in the sensitive matter might *inaccurately* copy the object being perceived. In this

case, the patterning motions are “irregular.” As Cavendish puts it, “the Senses present the Object truly as it is, unless the Sensitive motions and passages be Distempered and Irregular” (1663: 83). Thus, she observes, “honey is sweet to those that are sound, and in health; but bitter to those that have the overflowing of the gall,” because “the motions of the gall being irregular make a false copy” (Cavendish 2001: 273).

Hallucinations, too, involve irregular motions. In a hallucination, the sensitive matter moves in a figure that does not copy the motions of an external object. We saw earlier that regular voluntary figuring of *rational* matter is constitutive of reasoning, conceiving, and so on that is directed at objects not currently being sensed (Cavendish 2001: 150 and 170); likewise, voluntary figuring of the *sensitive* matter produces sensory-like experiences of objects that are not, in fact, currently present to the perceiver (and thus that are not occasioning the motions of the sensitive matter). As Michaelian notes, when this voluntary figuring of the sensitive matter is regular, it “results in creative or imaginative thought” (2009: 44). Hallucinations occur when that figuring is irregular (Cavendish 1663: 327).

The second way that perceptual errors can occur is when the motions of the sensitive matter, while regular, do not pattern the *whole* object. In this kind of case, the patterning motions are “regular,” but incomplete. This, Michaelian notes, is how Cavendish explains illusions. He cites the following passage from *Philosophical Letters* to show this:

According as the object is presented, the pattern is made, if the motions be regular; for example, a fired end of a stick, if you move it in a circular figure, the sensitive corporeal motions in the eye pattern out the figure of fire, together with the exterior or circular motion, and apprehend it as a fiery circle ... ; so that the sensitive pattern is made according to the exterior corporeal figurative motion of the object, and not according to its interior figure or motions.

(Cavendish 1664: 511; cited in Michaelian 2009: 43)

Thus, Cavendish does have an alternative explanation for perceptual errors. Moreover, as both Susan James and Michaelian have noted, it is a desirable feature of a theory of perception that it explain both veridical and nonveridical perceptions in the same way, since (as James puts it), “non-veridical figures are sometimes qualitatively indistinguishable from veridical ones” (James 1999: 236). Thus, it is a virtue of Cavendish’s theory of perception that “illusion is in a sense continuous with successful perception” and that “hallucination is in a sense continuous with creative thought” (Michaelian 2009: 44).

However, even if her own theory has its virtues, it is not clear that it is superior to PMP in explaining perceptual errors. As Adams notes, a fairly obvious reply to Cavendish’s two-man example is available to Hobbes. Hobbes could simply “appeal to physiological differences in the sense organs between the two individuals in her thought experiment,” as he does in *De homine* where he explains “dim-sightedness” by appealing to the way a smaller-than-usual retina alters how motions from external objects are received (Adams 2016: 200, 203). Cavendish’s claim that PMP cannot explain differences and errors in perception simply seems false, unless she *also* has grounds for rejecting an explanation that appeals just to physiological features.

Now, Adams argues that there is some evidence that Cavendish did *in fact* reject such an explanation: a passage in the first edition of Cavendish’s *Philosophical and Physical Opinions* contains a discussion of poor vision that appeals to the shape of the eye, but this discussion does *not* appear in the second edition (Adams 2016: 208). Adams takes this to mean that Cavendish shifted from explaining perceptual errors in physiological terms to explaining them in terms of irregular motions.¹¹ However, the fact that Cavendish *did* reject a purely

physiological explanation of perceptual error (that is, one that does not invoke irregular motions) does not establish that she had *grounds* for doing so. *Why* would Cavendish have rejected Hobbes’s physiological explanation? What was it about his physiological account that she thought failed to explain perceptual errors? If Cavendish is trying to establish that her theory of patterning better explains a phenomenon (here, perceptual errors) where Hobbes’s account faces a problem, then she cannot say that the *problem* with Hobbes’s account is that Hobbes does not appeal to patterning; that would beg the question.

Adams suggests that Cavendish believed PMP cannot explain perceptual errors because pressure is too simple to explain the variety of our perceptions (including the many ways that perceptions can go wrong) (Adams 2016: 207). On this interpretation, then, Cavendish does not argue *directly* against PMP’s account of perceptual errors; she has to depend on objection (3) above, that PMP fails to explain the variety we experience, in order to argue that PMP cannot explain perceptual errors. That is, Cavendish’s discussion of perceptual errors does not actually reveal a flaw in PMP that is *independent* of her other objections to PMP. And indeed she does not point to any specific reason why PMP has special difficulties with explaining perceptual errors; she merely asserts that it does have these difficulties.

Perhaps this does not seem too worrying; it just means that she was mistaken in thinking that perceptual errors *themselves* provide the basis for a counterargument against PMP and that her other objections to PMP must, accordingly, carry more weight. However, a similar problem arises with another class of perceptual phenomena that Cavendish claims poses a problem for PMP: perceptions that are distorted through the use of instruments such as lenses.

***Perceptions of objects through instruments like telescopes and microscopes
appearing distorted, or as bigger or smaller than they really are***

Cavendish maintains that instruments like the microscope and telescope, claimed by their proponents to improve on sense perception, are often even more misleading than the unaided senses. For example, she complains in *Observations* that a magnifying glass makes a louse look like a lobster, for in “enlarging and magnifying each part of it,” the magnifying glass “makes them bigger and rounder than naturally they are” (Cavendish 2001: 50). Likewise,

If the picture of a young beautiful lady should be drawn according to the representation of the microscope, or according to the various refraction and reflexion of light through such like glass; it would be so far from being like her, as it would not be like a human face, but rather a monster, than a picture of nature.

(Cavendish 2001: 51)

And in *Philosophical Letters*, Cavendish suggests that the fact that microscopes and telescopes misrepresent the size of objects is a reason for rejecting PMP. In fact, she suggests that this is actually her *best* argument against PMP. She writes:

There is no better argument to prove that all objects of sight are figured in the Eye, by the sensitive, voluntary or self-motions, without the pressure of objects, ... but that the eye doth not see all objects according to the Magnitude, but sometimes bigger, sometimes less: as for example, when the eye looks through a small passage, as a Prospective-glass, by reason of the difficulty of seeing a body through a small

hole, and the double figure of the glass being convex and concave, the corporeal motions use more force, by which the object is enlarged ...

(Cavendish 1664: 65–66)

So here too, as in the case of perceptual errors, Cavendish points to a class of perceptual experiences that is supposed to be the basis for an objection to PMP. And, as with perceptual errors, she offers her own alternative explanation of how lenses can occasion perceptions that appear smaller or larger than the item perceived without the lens. While her explanation is not very clear, she seems to suggest that it is difficult to see a body through a small hole and through two lenses, so the motions of the eye must “use more force” to pattern the external object—that is, the sensitive matter must work harder—and in working harder, it enlarges the image in the eye (Cavendish 1664: 67–68).

However, just as with Cavendish’s rejection of PMP to explain perceptual errors, it is hard to see why she thinks that the effects of lenses on perception pose a special problem for PMP. Mechanists certainly had explanations for magnification; for example, Descartes discusses refraction in his *Treatise on Light* and his *Dioptrics* (Descartes 1998: 66 and 76–84). Hobbes explains how lenses refract light in several texts, including his *A Minute or First Draught of the Optiques* (Hobbes 1646: 13–31). Since this text was dedicated and presented to Cavendish’s own husband, William Newcastle, Cavendish herself surely knew of it. Yet, despite her claim that “there is no better argument” against PMP, it seems that Cavendish relies on other objections to PMP rather than arguing directly that PMP cannot explain magnification.

Further problems for Cavendish’s account

I have argued that Cavendish’s inferential strategy in her rejection of PMP is to point to predictions that we would expect if PMP were true that are not borne out by our perceptual experiences, as well as to features of our perceptual experience that PMP does not explain or predict; however, I have argued, in many of these cases, she fails to show why PMP cannot explain or predict those effects. She does offer alternative explanations of these phenomena, but she does not show that those explanations are superior to explanations provided by PMP.

Moreover, Cavendish’s own theory of perception as patterning faces some serious problems of its own. Here I mention three. One difficulty is that her claim that perceptual errors result from irregularity in the sensitive or rational matter is not really a very illuminating explanation. What we want to know is, what causes those irregularities? Why does the matter choose not to act as it should? Unfortunately, Cavendish lacks a satisfactory explanation of why any part of matter might behave irregularly. She offers two suggestions. First, she notes that, “though Nature’s Parts are Self-moving, and Self-knowing, yet they have not an infinite or uncontrollable Power; for several Parts, and Parties, oppose, and oft-times obstruct each other; so that many times they are forced to move, and they may not when they would” (1668: 192). In other words, sometimes the actions of matter are unfree in a Hobbesian sense; that is, they are impeded by external objects that stop them from moving as they choose. But if Cavendish takes this route in explaining perceptual errors, then she seems not to be appealing to patterning after all.

Cavendish’s second suggestion is that parts of matter might choose to act other than they should because they simply become tired of acting as they should. Describing how the ear can mishear sounds or even become deaf altogether, she suggests that it is actually the love of *variety* which leads the matter of the ear to engage in irregular actions; the parts become tired of making the same movements, and “so through love to variety, change from working

regularly to move irregularly, so as not to pattern outward objects as they ought" (Cavendish 1664: 72–73). Her suggestion seems to be that when irregular actions *are* chosen by parts of nature, it is because the parts have adopted some goal—in this case, variety—which they value more than the goal of acting in the particular way Nature has dictated for things of that type. But to appeal to animate matter's desire for a variety of motions as an explanation of perceptual *errors* does not seem to sit well with Cavendish's claim that her account of patterning can better explain the variety of our *veridical* perceptions. If our veridical perceptions already display tremendous variety, why would animate matter desire *more* variety?

There is one perhaps obvious-seeming explanation for why motions are sometimes irregular that is, unfortunately, not available to Cavendish for explaining perceptual errors. One might think that motions are sometimes irregular because of ignorance; maybe the animate matter in the brain or sense organs doesn't know how it is supposed to act, or maybe it does not what is going on around it and acts irregularly because of that. But this suggestion won't work here. If, as she claims, perceptual errors are irregularities in the motions of animate matter in the perceiver, then it would be circular for Cavendish to explain irregularities as the result of perceptual errors.

The second serious problem for Cavendish's account of perception as patterning is that it seems to face a regress problem. The difficulty is this: the perception of external objects is to be cashed out in terms of patterning; patterning motions (whether accurate or not) *constitute* the act of sense perception. But in everyday cases of copying or imitation, we typically think that the object being copied must be perceived *first*, before it can be copied. For example, if I want to copy a drawing with my own pencil and paper, I need to *see* the drawing in order to copy it. It seems, then, that the patterning that Cavendish invokes to explain perception must *itself* be preceded by some kind of perception.

Some passages in her corpus hint at the problem. Explaining why we need exterior light to see and why we cannot see in the dark, she writes "But that we do not see ordinarily without exterior Light, the reason is, that the sensitive Motions cannot find the outward objects to pattern out without exterior light" (Cavendish 1664: 67). This appears to suggest that the sensitive matter must first identify the outward object and *then* pattern it. But if perception has to precede patterning, how would she explain that initial act of perception? Is that patterning, too? If it is, then Cavendish has a regress problem.

Some commentators have suggested that, for Cavendish, patterning is accomplished by sympathy (Broad 2002: 50; James 1999: 237–238); perhaps the regress can be stopped if Cavendish holds that it is sympathy between two objects that allows one of them to pattern or imitate the motions of the other. Yet Cavendish says that sympathies are "nothing else but plain ordinary Appetites and Desires" (Cavendish 1664: 289), and the occurrence of an appetite or desire for something would seem to presuppose perception of the thing desired. So it is not clear that an appeal to sympathy helps Cavendish here.

A third, related problem concerns the relationship in Cavendish's account between occasional causation and perception. As Detlefsen has pointed out, Cavendish's account of occasional causation requires that the parts in nature be perceptive (2007: 167). That is, occasional causation presupposes perception. And yet Cavendish's account of perception in terms of patterning is supposed to work via occasional causation: the external object occasions the animate matter to move in a way that copies the motions of that object. This is clearly circular; Cavendish cannot have it both ways. So, while Cavendish may have thought she was avoiding problems in the mechanists' account of perception as pressure, her own account faces some problems of its own.¹²

Notes

- 1 For example, she ends one preface by asking the reader to “be impartial in your judgment; let not self-love or envy corrupt you, but let regular sense and reason be your only rule, that you may be accounted just judges” (Cavendish 2001: 42), and she says that to be a “good philosopher” requires “regular sense and reason” (2001: 100; see also pp. 35 and 202). In *Philosophical Letters* she uses the related phrase “natural sense and reason”: “Wherefore Pure natural Philosophers, shall by natural sense and reason, trace Natures ways, and observe her actions, more readily than Chymists can do by Fire and Furnaces” (Cavendish 1664: 281).
- 2 A fuller discussion of Cavendish’s inferential strategy is beyond the scope of this chapter. From the taxonomy of abductions offered by Gerhard Schurz, Cavendish’s strategy seems best characterized as a second-order existential abduction, where “the explanandum consists ... of one or several general empirical phenomena, or laws,” and the abduced outcome is “an at least *partly* new property or kind concept governed by an at least partly new theoretical law” (Schurz 2008: 216; emphasis in original). In Cavendish’s case, the new kind concept would be self-moving matter, and the new theoretical law would be the tendency of self-moving matter to pattern the motions of other entities in the vicinity (although Cavendish might balk at calling this a “law”; see Boyle 2018: 114–115).
- 3 As Stewart Duncan has observed, Hobbes adds another requirement, which is that sensation requires memory (Duncan 2012: 393). For a detailed and careful discussion of Hobbes’s account of sense perception, focusing on its relationship to Aristotelian accounts, see Leijenhorst (2002: 56–89). Leijenhorst notes that in the work known as *The Short Tract* (written several decades before *Leviathan* and *De corpore*, the works with which Cavendish engages) (2002: 14–15), Hobbes allowed for active powers (2002: 177). However, in the texts Cavendish evidently knew, Hobbes “embraced an intransigent version of mechanicism” (Leijenhorst 2002: 195).
- 4 Because of Cavendish’s view that all matter is completely intermixed, of course, even very tiny particles are composed of the three degrees of matter, and because of her view that matter is continuous, she holds that it is infinitely divisible. So my reference to a “particle” should not be understood as ascribing atomism to Cavendish. On Cavendish’s views on atomism, see Boyle (2018: 40–61).
- 5 For a defense of reading Cavendish as a libertarian, see Boyle (2017); for an interpretation of Cavendish as a compatibilist, see Cuning (2016).
- 6 Brandie Siegfried has claimed that “Since there is nothing immaterial in Cavendish’s cosmology, all knowledge must necessarily be perceptual in one way or another” (2014: 74 n. 54). This interpretation has two problems. First, it subsumes self-knowledge under the category of perception, despite Cavendish’s insistence that they are different. Second, Cavendish’s denial that there are immaterial entities in nature does not commit her to the view that all knowledge must be perception. Self-knowledge, like perception, involves the motion of matter, and thus Cavendish can consistently maintain her materialism even while distinguishing self-knowledge from perception. Indeed, it is precisely that distinction that allows Cavendish to explain how finite parts can know anything about the infinite. Siegfried suggests that a problem for Cavendish is “how finite perceptions might, without contradiction, to some extent comprehend an infinite nature” (2014: 72), but Cavendish suggests that it is through *self-knowledge*, and *not* perception, that such knowledge is possible (2001: 17).
- 7 Cavendish limits her account of patterning to human perception (2001: 15). While she holds that patterning *could* explain other creatures’ perception, she also maintains that “no creature can know the infinite perceptions in nature, so he cannot describe what they are, or how they are made” (Cavendish 2001: 15), leaving open the possibility that some other process explains perception in other creatures. Susan James has noted that Hobbes uses the term “patterning” in a passage that Cavendish herself quotes, and that van Helmont also invoked patterning (James 1999: 232 n. 64).
- 8 David Cuning writes that “Cavendish’s view on the formation of sensory images in particular is that an external body comes into contact with a sense organ and presents an image of itself, and then bodies in the sense organs—by their own motions—form a copy of the image” (2016: 42; see also 60 and 189–90), so that sense perception involves “behold[ing] an image of the object” (2016: 36). However, as Marcy Lascano has pointed out, Cavendish does not claim that sense perception requires *contact* between an object and the sense organ (2017). Moreover, *images* of objects only play a role in Cavendish’s account of patterning when what is perceived is a *reflection* of an object in glass or water (see Cavendish 2001: 146–7). When Cavendish is not referring specifically to such perceptions of reflections, she makes it clear that sensitive matter patterns *objects* or (what comes to the same thing for her) the *motions of objects*—not images of objects.

- 9 David Cunning states that “sensory perception always involves a double perception—one sensitive and one rational” (2016: 35). This is rather misleading, as it suggests that *every act of perception* involves a double perception. What Cavendish says is that “there is a double perception in the infinite parts of nature” (2001: 144), suggesting that every part of nature is *capable* of a double perception but not that every *act of perception* involves a double perception; as we shall see, sensitive and rational perception can come apart.
- 10 This seems to be analogous to what is today called inattentional tactile insensitivity. For discussion of preliminary research regarding this phenomenon, see Mack and Rock (1998: 223–5).
- 11 Adams observes that the matter of the sense organs is still relevant for Cavendish’s later explanations of perceptual errors; however, in the later explanations, Cavendish emphasizes that errors are really the result of disordered motions of the matter in the sense organs rather than the result of some malformation in the shape or structure of the sense organ. As Adams writes, “in some instances defective visual perception or hearing can be explained by a fault of the sense organs, but the fault in such organs would be a fault in patterning; for example, they may pattern too many motions and cause confusion” (2016: 206).
- 12 An earlier version of this paper was presented at Wofford College in December 2017, where I benefited from the insightful questions and comments of the audience.

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PART V

Problems of perception in the post-Kantian period

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INTRODUCTION TO PART V

Brian Glenney and José Filipe Silva

The mind ... works on the data it receives very much as a sculptor works on his block of stone. In a sense the statue stood there from eternity. But there were a thousand different ones beside it, and the sculptor alone is to thank for having extricated this one from the rest.

(James 1890: 288)

The technological achievements and mechanistic interpretations of the study of perception in the early modern period was made more precise by the experimental methodologies of the nineteenth and twentieth centuries. The problems inherited from the early moderns, including Kant's attempts to reconcile them, could now be considered with more precise mechanistic accounts, leading to hypothesis and, ultimately, a science of perception with predictive and lawful results that today is taught as psychology. What largely motivated these post-Kantian accounts of perception from a philosophical perspective is determining the precise nature of the object of perception—what did we *really* perceive directly? Candidates included (1) the external object itself; (2) an internal image; and (3) some kind of hybrid of the two informed by the intellect. An even larger question was which methodology could be trusted with an answer. Interestingly, it may be that even at the dawn of perceptual experimentation, the methodology of conceptual analysis played a key role.

If today's psychological study of perception is any indication of this debate, divided into "sensation" and "perception," it suggests that there needs to be some conceptual distinction between the sensations that immediately and directly stimulate experience, and what it means to perceive or represent an object causing that experience. Perhaps the most robust study of this distinction is that of German psychophysicist Gustav Fechner, in the late 1800s, who determined the ratio of the intensity of a physical stimulus, or sensation, and the perceived intensity. Fechner and his colleagues believed they had discovered that the minimum stimulus that can be experienced by a sense like vision fluctuates evenly with the perceptual experience that represents the stimulus, a ratio termed the "absolute threshold." From this minimal stimulus that can be perceptually experienced, an increase in stimulus intensity is proportional to the logarithm of experience of the intensity. We can predict that a subject can distinguish between two weights that weigh 100 grams and 105 grams, but not 200 grams and 205 grams. A "just noticeable difference" at this higher weight would have to double to 200 grams and 210 grams.

Fechner's methods for determining the nature of perceptual experience, known as "radical empiricism" assumed a kind of dualism, where the physical stimulus and psychological experience consisted of two distinct but interrelated worlds accessible not by a method of introspection but by experimentation. He took the nature of the world of experience to be largely passive, a mirror to the stimuli presented to it, a claim that was sharply criticized by American psychophysicist and philosopher, William James, who advised that the "will" or attentive forces of the mind significantly influence experience, a mind that is "wild": inconsistent, discontinuous, and too indeterminate for predictive results. The brain is more of a focusing lens, a host of the mind rather than its permanent home, serving a "transmissive" function rather than the mind being purely dependent upon it. We can consider the wondrousness of such a consciousness by considering, as James did to his audience, that our thoughts, the editors, are being animated to yours, the reader, by a current of consciousness, "however numerous the intermediary conductors may have to be" (James 1977: 115–116). The nature of the conductivity, what James took to be Fechner's study, is but a secondary issue to the more fundamental query into the nature of consciousness itself.

Both papers in this section discuss attempts to reconcile the metaphysical "wild" nature of consciousness through the minutia of perceptual experience and its correlating physical stimuli. Michael Madary's essay begins with Husserl's own consideration of the yellow tint experienced by users of the drug *santonin*. It would be tempting to take a Fechnerian analysis: inspecting just how tinted the visual field becomes and, perhaps, what might happen if one were to view a yellow flower; would it appear "yellow-yellow"? Answers to such questions tell us nothing essential about consciousness for Husserl. So, what does Husserl derive about *santonin*'s yellow tint of visual experience? Husserl writes, "If I ingest *santonin*, then the whole world seems to change; e.g., it alters its color" (Husserl 1976; see p. 256). Madary goes on to claim that what shifts is our *expectations* of how the world is, making it abnormal and unexpected.

The yellow *santonin* shift and later recovery to normal perception after the drug wears off show, according to Madary, that recovery does not result in the once-yellowed representation of an external object becoming transparent, such that we then "see through" the representation with a clear rather than yellow filter. Rather, it suggests that there is no representation there to begin with but just a return to what we anticipate perceiving an object involves when not affected by *santonin*. In other words, conscious perception is fundamentally perceiver-dependent: *I* always view an object by *my* senses from *my* perspective. A second consideration brings out a further feature of consciousness: that *my* experience, or what I can experience of my experience, is embedded in a social community of other perceivers.

Imagine an entire community of people who, due to some genetic glitch, all see with a yellow tinge, or, to make it more realistic, all have color blindness. Color perception, to this group, would be abnormal, though more optimal. So, color would not be anticipated in normal vision for this group, even though humans do in general anticipate the ability to see color. Our personal expectations, which provide a basis for perceptual expectations that determine what we perceive and how we do so, hence, are cultivated by our social peers, thereby spreading out individual consciousness in a way that involves other perceivers in an essential way. Consciousness is, thus, individual *and* social.

What groups determine what kind of perception becomes optimal is the central question in Brian Glenney's discussion of Molyneux's question, whether a newly sighted person might immediately identify shapes previously identified by touch. Can such a question, or rather *should* such a question, be answerable by people with blindness? Glenney argues that, in fact, people with blindness provide trustworthy insight essential for providing answers into the

nature of new visual experience; ignoring these answers results in a kind of testimonial injustice. Considerations of people with blindness have a history of oppression, and a reclamation of their voices not only broadens what might be considered as answers to Molyneux's question but also avoids a common fallacy that numerous answers fall into: a content/vehicle conflation where the representation provided by a sense is confused with the sense itself.

Glenney considers unique answers to Molyneux's question by two people with blindness: Thérèse-Adèle Husson and Pierre Villey, both of whom present blindness as neither abnormal to human perception, nor suboptimal. People with blindness, in fact, do not view their disability as the "ocularist" culture at large does, as neither a deficit nor difference, but rather as *merely* different. To be *merely* different (Barnes 2016) is to be neutral in value, such that some individual people with blindness can view their disability as advantage and others as disadvantage. What disadvantages people with blindness more generally is the ocularism prevalent in society that fails to see difference as anything but deficient. The essay represents not only an inquiry into novel ways of answering Molyneux's question but provides a space of justice for people with disabilities in philosophical thought.

The post-Kantian essays in this volume provide a window into today's debates in perception, anticipating contemporary issues such as the hard problem of consciousness, representationalist theories of perception, and even the role of drugs and disability on perceptual experience. More importantly, we can observe the long arc from psychophysics to the cognitive sciences in investigating the problems associated with the nature of perceptual awareness.

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14

HUSSERL TAKES SANTONIN

Abnormality, embodiment, and intersubjectivity

Michael Madary

According to the *British Pharmacopoeia* of 1914, “Santonin, $C_{15}H_{18}O_3$, is a crystalline principle which may be obtained from santonica, the dried unexpanded flowerheads of *Artemisia maritima*, *var. Stechmanniana*” (332). It was widely used in the early twentieth century to treat intestinal parasites. It was also used as an example by Edmund Husserl to illustrate a particular kind of perceptual abnormality in his *Ideas II* and elsewhere. The perceptual abnormality mentioned by Husserl is a curious side effect of santonin: *one’s entire field of vision becomes tinted yellow*. Another side effect of santonin is the irreversible cessation of vital functions, which is why it is difficult to find in pharmacies these days.

In this chapter, I will present three themes in Husserl’s work on perception that can all, in different ways, be illustrated by his example of yellow vision due to the ingestion of santonin. These themes have received some treatment in the secondary literature on Husserl and within the phenomenological tradition but have not figured largely in contemporary philosophy of perception and perceptual psychology. I intend to show how these themes might both complement and challenge the contemporary research in these areas. The themes that I will cover are as follows:

- 1 The possibility of perceptual abnormality reveals the role that the lived body plays as the medium of all perception.
- 2 Characterizing perception as normal or abnormal motivates a consideration of high-level global features of perceptual content that are always relative to the perceiver.
- 3 Abnormal perceptual states suggest that intersubjectivity plays an essential role in the possibility of perceptual objectivity.

Before entering into each of these three themes, I will present some of the relevant features of Husserl’s account of perception as well some of the relevant passages on perceptual abnormality.

Husserl on perception and abnormality

If one were to characterize Husserl’s philosophy in its most general form, one might say that he was concerned with essences (Sokolowski 1974: Chapter 3), especially with the essential

features of consciousness. He emphasized, as is well known, that the perceptual modality of consciousness is *essentially perspectival*. Husserl addresses this fact in some of his earliest works (Husserl 1900/1901: VI §10) and throughout his main writings (Husserl 1966: §1–4) up until some of his latest works (Husserl 1973: §63, for example). In doing so, he offers one of the most sophisticated treatments of perspective to be found in the history of philosophy (Madary 2012). The perspectival nature of perception is philosophically puzzling. The properties that we typically perceive, such as size and volumetric shape, are perspective-independent. That is, the size and volumetric shape of objects do not typically change and do not typically appear to change, as one perceives objects from different perspectives. But, and here is the puzzle, the way in which those properties appear to us as we take different perspectives on objects does appear to change. The appearance of the table is different when our eyes are a few centimeters from it compared with the perspective we have when our eyes are a few meters from it. Despite the changing appearance of the table, there is no sense in which we perceive the table itself to change. The table itself remains constant, which is why this aspect of perception is now referred to as perceptual constancy.

Husserl's account of perceptual constancy is built upon two main concepts: anticipation and fulfillment (Madary 2017). Our perception of a table always includes unfulfilled anticipations of how that table would appear from different perspectives. As we move and take different perspectives on the table, those anticipations are typically fulfilled through sensations (Husserl 1993: VI; Hopp 2008). We experience the perspective-independent properties of objects through fulfilled anticipations of how those properties appear from our current perspective as well as unfulfilled anticipations of how those properties would appear from other perspectives. When we move, those unfulfilled anticipations become fulfilled. Of course, there are also instances in which we are wrong about the perspective-independent properties of the world, in which case our anticipations are wrong and would not be fulfilled as we move. In those cases, we experience surprise, or disappointment of our anticipations, instead of fulfillment. There are also cases in which we are unable to gain perceptual fulfillment due to unfamiliarity and due to perceptual abnormalities. Here is an example of each case.

Unfamiliar environments can be a source of disappointment for our perceptual anticipations. Consider a situation in which one visits a foreign country for the first time. In such situations, we have anticipations about how things will appear as we move, and those anticipations are usually more or less fulfilled—tables continue to look like tables. But those anticipations are less determinate and more likely to be disappointed than the anticipations we have for our home environments. In unfamiliar environments, we have only a vague notion of how novel objects will appear as we gain different views on them. Perhaps the patterns of ornamentation are new to us. Perhaps the layout of the environment itself is surprising. In contemporary terms, we might say that these situations involve surprising sensorimotor contingencies (O'Regan and Noë 2001; Noë 2004). That is, the perceptual content of “if I move in this manner, then I will see this” is generally indeterminate in the consequent and quite often false in unfamiliar environments.

Now consider a case of perceptual nonfulfillment due to the abnormal. Note that the meaning of the abnormal for Husserl is different from the way we might identify something as abnormal in science or medicine (Steinbock 1995a: 241–242). Husserl is concerned with abnormality in a phenomenological sense, which means an abnormality of experience itself.¹ For the abnormal in Husserl's sense, consider some of the most common occurrences of perceptual abnormality that we experience due to external conditions preventing us from having an adequate perception of the properties of objects. Some lighting conditions generate a kind of perceptual abnormality relative to the color of objects because they make it difficult

to distinguish the colors of different objects. Here is an example from Husserl of perceptual situations in which we experience abnormality due to lighting conditions:

[C]ertain conditions prove to be the “*normal*” ones: seeing in sunlight, on a clear day, without the influence of other bodies which might affect the color appearance. The “optimum” which is thereby attained then counts as the *color itself*, in opposition, for example, to the red light of the sunset which “outshines” all proper colors.
(Husserl 1989: §18b)²

Note an important difference between the first example of visiting an unfamiliar environment and the second example of our inability to detect the colors of objects due to a red sunset. In the first example, our anticipations are indeterminate and likely to be partially disappointed. In the second example, there is a sense in which our anticipations are relatively determinate and are fulfilled: the objects will continue to be outshined by the sunset as we move and gain different views on them. But there is also, I suggest, a sense in which our anticipations are unfulfilled in the case of the sunset. Namely, if we understand perceptual fulfillment as having an adequate view of objects, as does Husserl (2004: 144–148; Husserl 1993: VI §16 and §24), then the case of the sunset is one in which we lack perceptual fulfillment for the case of color. When we cast abnormality as a lack of fulfillment due to an inadequate view of things, then normality becomes a form of *optimality*, as indicated in the passage above (also see Steinbock 1995b: Chapter 9). This second sense of fulfillment, the fulfillment that we lack in cases of perceptual abnormality, will be important for what follows.

The case of the red sunset outshining the proper colors of objects is a case of perceptual abnormality due to external conditions. Husserl also presents cases of perceptual abnormality due to a change in the perceptual organ itself, which brings us back to santonin: “If I ingest santonin, then the whole world ‘seems’ to change; e.g., it ‘alters’ its color ... Afterwards, as is the case with every change of colored lighting, etc., I once again have a world which matches the normal” (Husserl 1989: §18b).

With santonin, we are unable to see the normal colors of things—we are unable to discern the colors of objects in an optimal way—because our entire field of vision takes on a yellow tint. Another way in which perceptual abnormality can occur due to a change in the perceptual organ itself would be cases such as a touching something with a blister on one’s finger or when we are crossing our eyes (Husserl 1989: §18b).

So far, I have presented cases of unfulfilled perceptual anticipations due to unfamiliarity, when sensorimotor contingencies are disappointed, and cases of unfulfilled perceptual anticipations due to perceptual abnormality, when we are unable to gain an optimal view of objects due to either the environment or a change in the perceptual organ itself. Going beyond Husserl’s examples in his *Ideas II*, we can also consider cases in which there is both unfamiliarity and abnormality. The unfamiliarity may be so extreme as to prevent coherent visual perception entirely, thus engendering perceptual abnormality. One such case can be brought about using technology. Imagine, say, you were to put on a pair of up-down inverting goggles of the sort used in experiments by the Gestalt psychologist Ivo Kohler (1964; Stratton 1896; Harris 1965; Degenaar 2014), or a contemporary version using a head-mounted virtual reality display with a feed from a 360-degree camera that has been systematically inverted. When you look up, you see what is below you, and when you look down, you see what is above. In this case, the pattern of sensorimotor contingencies is unfamiliar initially. And the unfamiliarity is so extreme as to prevent you from making any sense at all of the visual scene. Such a perceptual situation would obviously prevent you from having an adequate view

on things, and would thus be abnormal in Husserl's sense. As some readers may be aware, the subjects in Kohler's experiments eventually adapt to the inversing goggles if they are able to explore freely while wearing them. They regain the ability to perceive the environment as the unfamiliar becomes familiar over time. As this adaptation occurs, the perceptual situation gains normality. The case of inversing goggles is not a change in the perceptual organ itself, at least initially. For a change in the perceptual organ itself that engenders an experience that is both unfamiliar and abnormal, one might ingest a classical hallucinogen—also difficult to find in pharmacies these days.

This section of the chapter has presented, using examples, some of the key concepts for the three main themes that will follow. Perception, for Husserl, is an ongoing process of anticipation and fulfillment. In unfamiliar environments, anticipations lack determinacy and those anticipations are more likely to be disappointed. In cases of perceptual abnormality, perception lacks fulfillment due to the fact that we are prevented from gaining adequate views on objects. Abnormality can occur due to external or internal conditions, due to an abnormal perceptual environment or a change in the perceptual organ itself. Now I turn to the three main themes of the chapter, as mentioned above.

The body as medium of perception

Leading up to the passages cited above, Husserl asserts that “The Body is, in the first place, the *medium of all perception*; it is the *organ of perception* and is *necessarily* involved in all perception” (Husserl 1989: §18b). Cases of perceptual abnormality illustrate this claim nicely because they make the fact that the body is a medium directly manifest to us as perceivers. When one has ingested santonin and sees everything with a yellow tint, or when one tries to perceive the surface of an object by touching it with a blistered finger, the temporary abnormality of the body itself changes the way in which the world appears to us. When things are going well and the world appears to us normally, the fact that the body is a medium can be easily overlooked, but it would be an error to do so. The important insight from cases of perceptual abnormality is that the body is always the medium of perception, even in normal cases.

Another way of putting this point is to consider two possible ways of describing the return to normally colored vision after santonin wears off. First, one might say that the difference is that we return to perceiving the true colors of things. There is a sense in which this first way of describing the change is appealing, entirely unobjectionable in everyday discourse. But another, more accurate, way of describing the change is to say that the medium of perception has changed from an abnormal state to a normal state. This second way of describing the change draws our attention to the fact that the change is merely a change in the medium from one state to another: it is not a change that removes the medium entirely so as to allow direct access to the world of color as it is in itself. The “color itself” is determined by the optimum view that bodies such as ours can have, as Husserl indicates in the passage cited above. Even when normal, our sense organs always remain, as Husserl writes, “a kind of distorting eyeglasses” (Husserl 1989: 90). An understanding of perceptual properties in this way, as depending on the normality of bodies such as ours, introduces a role for intersubjectivity in the analysis of perception, which will be discussed in further detail below in the third theme of the chapter.

A point that follows from the fact that the body is the medium of perception is that the optimal way of perceiving properties is determined by the nature of the body itself. Just as we might adjust the lens on a microscope or a pair of binoculars in order to gain the best view of something, so we must move our bodies through continuous action. Some of these

movements are similar to adjustments of the lenses on microscopes, such as fine-grained adjustments of the eyes themselves (Merleau-Ponty 1962: 302; Steinbock 1995b: 141–142). But movements of the entire body are also relevant here, as in Merleau-Ponty's well-known example of one's being drawn to a particular spot in a museum in order to obtain the best view of a painting (Merleau-Ponty 1962: 302). Norms of action proceed out of our natural tendency toward optimal perceptual states (Husserl 1973a vol. XIV: 123: 123; Taipale 2012).

The perceptual organ which is our entire body makes it so that there is a proper way to act in order to perceive. Note that in these remarks I am not going so far as to suggest that we are always inclined to adjust the body so as to gain a better view on objects. We must keep in mind the obvious cases of properties in the world that we may not care to perceive, such as unpleasant odors or distasteful images. Thus, I would add a qualification to the way that Kelly puts the point in his commentary on Merleau-Ponty, in his claim that "Lighting leads the gaze in the sense that I have a direct bodily inclination to look where the lighting is best in order to see the color of a thing" (Kelly 2004: 101–102). The qualification is that we are only inclined to seek the optimal for some properties. My point is that optimal perceptual conditions *for the properties that we do care to perceive given our interests and goals* always involves an adjustment of the medium of perception, which is the lived body (Doyon 2018; Husserl 1973b §36). Also, the way in which we seek the optimal for one kind of property might exclude the actions that would enable us to seek the optimal for another kind of property. Seeking optimality is always constrained by the limitations of our embodiment.

Before moving to the second main theme of this chapter, I would like to make some remarks about how this first theme might be relevant for one of the main areas of dispute in contemporary philosophy of mind. Philosophers have appealed to something like G. E. Moore's claim that experience is transparent as a motivation for representationalism about perceptual experience, for rejecting that the view that we are aware of intrinsic properties of experience, or qualia (Harman 1990; Tye 1995, 2000). It would require a separate work to investigate properly how the body as medium of perception would figure precisely in the large literature on qualia and the transparency of experience, but here are some brief comments as to how the insight might be helpful. The main point of Moore's that has received so much attention is that our efforts to introspect qualities of experience always leave us attending to properties of objects in the world. Moore wrote: "That which makes the sensation of blue a mental fact seems to escape us: it seems, if I may use a metaphor, to be transparent—we look through it and see nothing but the blue" (Moore 1993: 37).

Contemporary representationalists about experience appeal to transparency in order to deny that there are intrinsic, or nonrepresentational features of experience. A typical positive formulation of the representationalist view is that phenomenal character supervenes on representational content. That is, if experience A has the same representational content as experience B, then experiences A and B have the same phenomenal character (Tye 2000: 45). The representational content "exhausts" the phenomenal character of the experience in the sense that there is nothing to the phenomenal character outside of representational content.

But is Moore's claim about transparency accurate? One immediate objection is that, as the preceding remarks of this chapter should make clear, we do not simply see "nothing but the blue." We see the blue, say of a carton of blueberries, from various distances and in various lighting conditions. We also see the blue in various states of the perceptual, in this case visual, organ: the eyes and the brain. Of course, the state of the visual organ does not typically fluctuate in a noticeable manner, but it can do so, and this point should not be neglected. It can change, for example, after receiving a blow to the eye, while adjusting to dim lighting conditions, during double vision and afterimages, and after ingesting some substances, such as *santonin*.

Representationalists, in denying that there are intrinsic properties of experience, have come up with replies to some of these concerns. For example, one reply to the fact that we always perceive properties from particular perspectives is to claim that we represent properties that objects have “from here” (Harman 1990; Tye 2000: 78) or “perspectival properties” (Noë 2004). A standard reply to cases of double vision, afterimages, and other “oddities” is to maintain that those cases always involve a change in representational content along with the change in phenomenal character (Tye 2000: Chapter 4). In the case of santonin ingestion, the representationalist reply would be that the yellow tint to the visual field does represent the world as having turned yellow, even though we do not form the conceptual judgment that the world has in fact become yellow.

This representationalist strategy for dealing with perspective and other perceptual oddities strikes me as flawed due to the fact that it is *ad hoc*. It is *ad hoc* because the theory itself is not set up to account for these cases in an effective manner. Each perceptual “oddity” requires a new case to be made to the effect that the change in phenomenal character is always a change in representational content. The *ad hoc* nature of these replies is especially troublesome due to the fact that the perspectival nature of perception is universal; it is not something that only occurs when we look at tilted coins or rows of trees (see Madary 2017: Chapter 2). The purported change in representational content for each of these cases departs from the usual understanding of representational content. That is, representational content is typically understood as representing the world to be one way or another. These cases add troublesome and suspicious qualifications, prompting claims that we have content that represents the world to be a particular way “from here” or that the world is represented to be a particular way even though it is not actually judged to be that way on the conceptual level.

Husserl’s point that the body is the medium of all perception offers a way forward that has been missed by both sides of the controversy. The representationalist has it that all perceptual experience is purely a matter of how we take the external world to be, and the opposition has it that experience has a phenomenal character that is a property of the experience itself (Block 1996). The alternative to both extremes is to say that *experience always involves a medium which is the body*. *Qua* medium of perception, the body is neither external nor internal: it is the medium through which the external is made manifest. All of the cases that prompt *ad hoc* responses from the representationalist are cases that involve changes to the body. Changes in perspective involve changes in the spatial location of the body (or changes in the external world relative to the body) and the other “oddities” such as double vision, afterimages, and santonin involve changes in the body itself as organ of perception. The representationalist has committed the error of understanding normal perception as an unmediated report on the way the world is and then finds a challenge in accounting for perceptual “oddities” or abnormalities. The way to avoid this challenge, I suggest, is to understand both normal and abnormal perception to occur always through the medium of the body. Changes in perspective bring about fluctuations in the optimal vantage point for perceiving properties and changes in the perceptual organ itself alters the normality of the medium of perception. The cases that do not involve “oddities” are not returns to transparency but rather are returns to normalcy.

Global and perceiver-relative perceptual content

Now consider the second theme that perceptual abnormality raises. If one describes all perceptual content as more or less optimal, then we have a way of describing perceptual content in terms of a high-level global feature. This description marks a departure from the standard way to approach perceptual content, which is in terms of propositional content regarding the

particular properties that are represented (Searle 1983: 40; Byrne 2001). For instance, on the standard approach, perceptual content tells us that such and such is the case: that the cat is on the mat, that the milk has gone sour, that the cold front has arrived. The standard approach has perceptual content constituted by representations of multiple features of the perceptual environment. Understanding perceptual content in terms of a deviation from normality, or as more or less optimal, is different from the standard approach in two main ways. First, it presents a type of perceptual content that is global. Second, it introduces a type of content that is always relative to the perceiver; it is not purely world-directed.

The consideration of perceptual content as more or less optimal introduces a global parameter for content. In the previous section, I discussed optimality relative to particular properties that we would like to perceive. It is an oversimplification to say that we perceive, say, the spherical shape of an object. We always perceive the sphere from a particular perspective and that perspective is more or less optimal relative to our ability to perceive the volumetric shape of the object. In addition to optimality relative to particular properties, an entire perceptual modality can be described as more or less optimal. When one has yellow-tinted vision due to *santonin*, or when one is in poor lighting conditions, the entire visual modality deviates from the optimal viewing conditions in which the facing surfaces of objects “reveal themselves as they really appear” (*“zeigt, wie sie wirklich aussieht”*) (Husserl 2004: 210). Even our entire multisensory perceptual experience can be described as more or less optimal. For example, it is more optimal when one is in good health and clear perceptual conditions, and less optimal when one has the flu or is under the influence of a dissociative drug. The understanding of perception as more or less optimal is a simple and elegant way to conceive of perceptual content. It suggests a unifying characteristic of all perceptual content, which can be contrasted with the piecemeal nature of the usual approach.

Since optimality of perceptual content is always relative to the perceiver, this alternative way to conceive of perceptual content departs from the standard, purely world-directed, conception of content. The traditional view has it that perceptual content offers an unmediated report of the external world, to represent “the world as accurately as possible, without embroidery or fiction” (Akins 1996: 344). The alternative conception of perceptual content can be construed as always being relative to the background and expectations of particular perceivers. In other words, perception does not answer the question of what is out there so much as it answers the question of whether there is anything out there that is abnormal or suboptimal relative to one’s background and goals.

Both of these points—perceptual content as having a general global feature and perceptual content as relative to the perceiver—dovetail nicely with some of the central themes in recent work in the predictive processing approach to cognition (Friston 2005; Clark 2013, 2015a, Hohwy 2013; Madary 2017: Chapters 5 and 6). On this approach, or family of approaches, perception and action are explained in terms of the minimization of prediction error. The brain actively predicts upcoming sensory inputs and then works to minimize the error in those predictions either by revising its internal model of the world (perceptual inference) or through self-generated motor movements (active inference). As above, this understanding of perception characterizes perceptual content in terms of one global feature: the degree to which it deviates from what is predicted. Abnormal perceptual conditions increase prediction error, and since the overarching goal of cognition is to minimize such error, abnormality is nonoptimal. The notion that perceptual content is relative to individual perceivers is also a feature of the predictive processing framework. The central role given to predictions on this framework leads to a situation in which perceptual content is determined by the particular predictions that individual perceivers happen to have. Importantly, those predictions will vary according to the sensorimotor history, the form of embodiment, and the

immediate goals of individual perceivers or organisms. Thus, perceptual content is always organism-relative (Madary 2015), which is another way of expressing the idea that the body is always the medium of perception.³

While Husserl's phenomenology of perception does share these two themes with the predictive processing approach, there is at least one important way in which his work may not be compatible with elements of it. Thus, Husserl's theory of perception is not susceptible to the objections commonly raised against the ambitious explanatory scope of error minimization for predictive processing. One such objection to the predictive processing approach that can be raised in the context of our consideration of all perceptual content as having the global feature of deviating from normality, known as the darkened-room problem (Friston et al. 2012; see Clark 2017 for three variations of the problem). The objection is that an organism seeking only to minimize its prediction error would do well to shut itself off in a stable environment, such as isolation in a dark room, in order to decrease the chances of any surprising perceptual input. Obviously, organisms do not typically behave in this way. On the contrary, humans commonly make great effort to seek out novel and surprising experiences. Proponents of the predictive processing approach have suggested various ways of responding to the objection (Friston et al. 2012; Clark 2017) which will not be evaluated here.

Since Husserl does not, as far as I can tell, suggest that all human activity is reducible to seeking out perceptual normality, his work should not be strongly identified with the full and most ambitious version of contemporary predictive processing. His account is not challenged by the darkened-room objection. Nonetheless, it may be instructive here to offer a few comments about Husserl's positive account of human action in order to illustrate the similarities and differences with the contemporary theory that reduces all human action and perception to error minimization. The similarity between the two approaches, Husserl's and predictive processing, is that both offer a way of looking at perceptual content in terms of high-level global properties that bring out the interdependency of action and perception. For Husserl, perception is more or less optimal relative to one's goals (Doyon 2018). Since optimality can be increased or decreased through intentional adjustments of the medium of perception, the body, action, and perception are essentially interrelated. For predictive processing, perception and action are unified through the single goal of error minimization. We can reduce error by perceptual inference, which is revising our internal model of the world or by active inference, which is performing actions that reduce both interoceptive and exteroceptive error signals (Seth 2013; Hohwy 2013).

One main difference between the two approaches has to do with the way in which each approach understands human action in relation to causality in the natural sciences. The predictive processing approach is typically thoroughly naturalistic, seeking to reduce human action fundamentally to the laws of physics, to the second law of thermodynamics in particular (Friston 2013). For Husserl, the causality that we investigate in the natural world is *essentially* different from that which is involved in deliberate human action. Husserl marks this difference by referring to intentional action in terms of "motivation" instead of mental causality. He does so because he understands causality to apply only to the natural world, not to the sphere of our mental lives considered subjectively. That is, if we follow Husserl in regarding causality to be "that functional or lawful relation of dependence which is the correlate of the constitution of persistent properties of a persistent real something of the type, nature," then the deliberate actions flowing from the unity of consciousness do not count as a form of causality (Husserl 1989: §32, 140). The sphere of our psychic lives, from which intentional actions emanate, is essentially different from the natural world in that the former lacks spatial extension (following Descartes, Husserl 1989: §12, 31), is marked by continuous

flux, and is strictly “unfragmentable” (§32). Objects in the natural world, by contrast, necessarily have spatial extension, their properties can remain unchanged over time, and they can be, in principle, fragmented into their constituent parts. Prefiguring themes that will be central for Elizabeth Anscombe (1957) later in the twentieth century, Husserl insists that “No causal research, no matter how far-reaching, can improve the understanding which is ours when we have understood the motivation of a person” (Husserl 1989: §56 ff., 241). Rather than reducing human motivation to one principle, Husserl explores a number of forms of motivation, including motivation under the norms of reason (§56a), and motivation through associations and habits (56§b).

Abnormality and intersubjectivity

In discussing how perceptual abnormality leads to the point that the body is the medium of perception above, I mentioned the case of a return to the normal color appearance of objects when the visual effects of *santonin* subside. There I suggested that the “color itself” of objects is determined by the optimum view that bodies such as ours can have. This point introduces intersubjectivity into the discussion. Husserl uses two thought experiments in order to illustrate the essential role that intersubjectivity plays in perceptual objectivity. The first thought experiment involves an individual making the transition from solipsistic to intersubjective experience and the second involves a generation of color-blind humans.

In the sections of *Ideas II* following the example of abnormal vision due to *santonin*, Husserl investigates a situation in which a solipsistic subject first begins communication with other subjects of experience.⁴ He investigates how the apprehension (*Auffassung*) of perceptual objects could become objective in relation to the other subjects. The question is puzzling because we do not typically regard the flow of perceptual experiences as involving other subjects. Experience is always “for me.” Here Husserl makes a crucial point:

Each thing of my experience belongs to my “environment,” and that means first of all that *my Body (Leib)* is part of it precisely as Body ... Strictly speaking, the *solus ipse* is unaware of the *Objective Body* in the full and proper sense, even if the *solus ipse* might possess the *phenomenon* of its Body and the corresponding system of experiential manifolds and know them in just as perfect a way as the social man.

(Husserl 1989: §18 ff., 86)

After having established the body as the medium of all perception using the example of abnormal perceptual experiences, Husserl now makes the point that solipsistic experience is curiously unlike our familiar intersubjective experience of the objective world. In contrast to solipsistic experience, our intersubjective experience is one in which our bodies are not purely media of perception. Our bodies are also objects in the perceptual environment for others to perceive. He goes on to conclude that “the *solus ipse* does not truly merit its name” (Husserl 1989: §18 ff., 86). With this conclusion to the thought experiment, Husserl means to suggest that a purely solipsistic subject is conceptually incoherent because such a subject would not experience an environment of objectivities. The solipsistic subject cannot have such an experience because that experience would require the experience of the subject’s own body as an object in the environment for others to perceive. And it is precisely the subject’s own body, *qua* objective body for others, that the solipsistic subject cannot experience. This thought experiment reveals one way in which perceptual objectivity requires intersubjectivity for Husserl.

As with the previous themes covered here, there is much more to investigate. In future work, it may be relevant to consider the empirical evidence that disorders of social cognition correlate with abnormalities in bodily self-awareness. This evidence suggests that there may be empirical results relevant for Husserl's connection between intersubjectivity and bodily self-awareness. For instance, children with autism spectrum disorder appear to have superior interoceptive ability and are less susceptible to the rubber-hand illusion (Cascio et al. 2012; Schauder et al. 2015).

The second thought experiment brings out the point that perceptual normality and abnormality are always *relative* to an intersubjective community of perceivers. After discussing how perceptual normality is constitutive of the world of experience in the form of "biophysical" optimalities as discussed above, Husserl suggests that the normality that is constitutive of the perceptual world is something that is relative. The effects of santonin appear in a footnote to these passages, where Husserl calls for an account of why the side effect of santonin is not constitutive of a visual perceptual world but is instead taken to be anomalous (Husserl 1973a vol. XIV: 133 n.). He explores this topic by proposing a thought experiment involving a community (*Volk*) of color-blind people who pass on this trait across generations. New generations would constitute the "color-blind" visible world as normal. Husserl then considers the scenario in which the congenitally color-blind community comes into contact with a community such as ours, which is not color-blind. He suggests that the congenitally color-blind would accept that their visual perception is not optimal relative to ours just as a color-blind individual born into our community would (Husserl 1973a vol. XIV: 133; Wehrle 2015).⁵

The reason for raising these scenarios through thought experiments is to show both that perceptual optimality is always relative to an intersubjective community of perceivers and that the diversity of perceptual abilities suggests a diversity of perceptual normalities. This diversity can be intraspecific, as in the thought experiment or in observed variation among human perceivers (Hardin 1988: 76–82), or interspecific as in the contrast between human perception and, for instance ants or birds (Husserl 1973a vol. XIV: 133).⁶ With these considerations, Husserl asserts that there is no form of embodiment that is absolutely normal—that enables the embodied subject to experience the world "in the final and perfect way as simply true" (1973a vol. XIV: 134).⁷ One might claim, as David Marr does, that human vision is "very much more general" than the visual systems of other species in which we find mechanisms for detecting particular objects, such as predators and prey (Marr 2010: 32). The point Husserl seems to be making is that, even if this claim of Marr is true, we must consider optimal perception relative to all conceivable forms of embodiment not just the other species that happen to inhabit the earth (also see Husserl 1974: §93b on this point). No species, according to Husserl, can claim to possess the optimal perceptual system in which all properties of things reveal themselves (1973a vol. XIV: 135).

As with the previous themes, Husserl's approach here may be pertinent for contemporary work in the philosophy of mind, particularly in the philosophy of color vision. And as with previous themes, there is insufficient space to locate Husserl's view precisely within the contemporary literature.⁸ If one were to seek expression of a position similar to Husserl's in the contemporary literature, it may be what is known as color relationalism (Averill 1992; Cohen 2009). The contemporary color relationalist is strongly motivated the fact that color appearances are relative to different perceivers and different environmental viewing conditions. This sort of relativity, of course, is what Husserl illustrates in the thought experiments presented above. Averill's formulation of color relationalism uses terms that are familiar from Husserl's reflections on perceptual abnormality:

Suppose that “yellow” is regarded as a relational term having two suppressed argument places; one argument place takes populations as values and ties any instance of being yellow to the normal perceivers of a population, the other argument place takes environments as values and ties any instance of being yellow to the optimal viewing conditions of an environment.

(1992: 555)

More recently, Jonathan Cohen (2009) has developed a broader account of color relationalism that is motivated by the same sorts of concerns that we see in Averill and Husserl. One possible difference between Husserl’s view and contemporary color relationalism is that Husserl was interested in giving a constitutional analysis of intentional objects (Sokolowski 1970), including colors. On his view, colors are *intersubjectively constituted*. It is not clear to me that contemporary color relationalists would embrace this manner of describing colors, as it reflects Husserl’s transcendental philosophy, which is in opposition to the metaphysics of naturalism that many professional philosophers find attractive today. On the other hand, it may be the case that the full implications of color relationalism does bring one close to Husserl’s understanding of color as intersubjectively constituted.

Conclusion

The goal of this paper has been to present three themes about the nature of perception that can all be illustrated by Husserl’s example of temporarily yellow-tinted vision due to the ingestion of santonin. These themes find relevance in a number of live issues in the recent literature, including perceptual transparency, high-level and organism-relative perceptual content in predictive processing, and the relativity of color to conditions and populations.

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Notes

- 1 In addition to his *Ideas II* (Husserl 1989), much of Husserl’s work on normality and abnormality can be found in his middle and late works collected in the three *Husserliana* volumes on intersubjectivity (Husserl 1973a: XIII, 358–381; XIV, 120–131; XV, 131–171, 227–236), but his description of perceptual abnormality in terms of a damaged perceptual organ can be traced back to writings as early as 1898 (Husserl 2004: 209–213).
- 2 I will return to this theme below, see p. 263, where I explain that normal appearances for Husserl are always relative to an intersubjective community of perceivers.
- 3 While many well-known interpretations of predictive processing fall within the traditional internalist and representationalist paradigm in cognitive science (such as Hohwy 2013), Andy Clark (2015a) has made the case that the organism-relativity of perceptual content can be the basis for an interpretation of predictive processing that accommodates anti-representationalist themes from enactivism (Varela et al. 1991; Thompson 2007). Recently, Dan Zahavi (2017) has attacked the more traditional internalist and representationalist interpretation of predictive processing from the perspective of Husserlian transcendental philosophy. Importantly for the present discussion, Zahavi allows that interpretations of predictive processing along enactivist lines are not within the crosshairs of his critical remarks, noting that the enactivism developed by Varela and Thompson “has many affinities with Husserl’s position” (2017: 12). It is not within the scope of this chapter to take on the challenge of exploring the relationship between various interpretations of predictive processing with Husserl’s transcendental idealism. Also see Madary 2017: Appendix; Bruineberg et al. 2016; Gallagher and Allen 2017; Piekarski 2017.

- 4 While working on *Ideas II*, Husserl had already taken up the project of transcendental phenomenology which involves a constitutive analysis of intentional objects, including objects of perception. This philosophical methodology is an ambitious departure from his earlier *Logical Investigations* which he regarded as merely descriptive psychology. See the appendix of Madary 2017 for further details.
- 5 While Husserl discusses optimality as being relative to an intersubjective population, we might ask about whether perceptual optimality can vary down to the level of individuals within an intersubjective population. Similarly, one might imagine environmental conditions in which normal human color vision turns out to be disadvantageous for survival. Thanks to Brian Glenney for raising these issues.
- 6 For a fascinating review of the differences in color vision across animal species, see Thompson (1995: Chapter 4).
- 7 “in der letztvollkommenen Art als schlechthin wahre”
- 8 For accounts of the various theoretical options in the debate, see Byrne and Hilbert (2003); Cohen (2009: Chapter 1); and Maund (2012).

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15

MOLYNEUX'S QUESTION

Out of touch with the “world of the blind”

Brian Glenney

Might a person with blindness whose sight is restored visually identify shapes known to their touch at the moment of sight restoration?¹ The 300-year history of this question, known as Molyneux's question, has produced a cluster of forward-moving philosophical theories, experimental designs, and publicization of important medical breakthroughs for people with blindness (Degenaar 1996). The question itself was inspired by just such a cluster of progressive aspirations, as William Molyneux, the creator of the problem, was an ardent supporter of empiricism, experimenting on numerous problems in optics including the problem of convergence in double vision, and finally attempting various cures for his own wife's late blindness. Yet two philosophical failures permeate its discussion:

1. **Testimonial injustice:** Direct testimony from people with blindness is ignored, misconstrued, or relegated (Barnes 2016; Schillmeier 2006; Kleege 2005).
2. **Content/Vehicle conflation:** The sensory vehicles of the senses of sight and touch are often conflated with the sensory contents produced by sight and touch (Millikan 1991).

My aim here is to present two novel answers to Molyneux's question from people with blindness that correct these failures.² This contribution, like so much of the history of philosophy, hopes to rewrite history and chart a wider future horizon, which is one of the aims of the series in which this current volume appears.

I begin by considering Thérèse-Adèle Husson's "Reflections on the Moral and Physical Condition of the Blind" (1825), a memoir by a woman with blindness, for educating people with sight about people with blindness, a section of which I read as a "none" answer to Molyneux's question—an answer by a person with blindness who knows that their perspective is marginalized.³ In the second section of this chapter, I consider Pierre Villey's "The World of the Blind" (1930), a memoir by a man with blindness intended to correct various misconceptions of blindness, which includes a novel "inverse question" answer to Molyneux's question that asks about the nature of new tactile experience. In the third section, I translate these answers into an avoidance strategy for the vehicle-content conflation fallacy, one that invalidates many answers including a most popular and egregious species of answer to Molyneux's question that claims people with blindness lack spatial concepts altogether, a line of thought from Platner (1793) to Lotze (1887) to von Senden (1932).

Testimonial injustice

There is only recent contribution to Molyneux's question that gives some consideration to the direct testimony of people with blindness (Paterson 2016). This may be partly due to the obscurity of publications by people with blindness. Also, it is not clear whether these publications would even count as responding to Molyneux's question as they do not ever mention Molyneux's question by name.⁴ The potential bias against testimonies by people with blindness is another concern, particularly as there is a perception that more reliable sources exist, such as philosophical argumentation and empirical evidence from medical reports and, in contemporary work, data from the cognitive sciences (Glenney 2014). The reliability of the most famous of such reports by Cheselden (1728), however, is questionable, a skepticism that exists for other empirical variations today (Schwenkler 2012).

If we read the crux of Berkeley's (1709) *hypothetical* person with blindness next to Cheselden's later report by an *actual* newly-sighted boy's experience, we notice a suspicious amount of similarity:

A man born blind, being made to see, would at first have *no idea of distance* by sight; the sun and stars, the remotest objects as well as the nearer, would all seem to be *in his eye*, or rather in his mind.

(Berkeley 1709: section 41; emphasis mine)

So far from making any judgment of distances, that he thought all objects whatever *touched his eyes* (as he expressed it) as what he felt did his skin.

(Cheselden 1728: 448; emphasis mine)

Cheselden's report appropriates Berkeley's hypothesis.⁵ In both statements, a newly-sighted person is denied the perception of distance and then is claimed to see objects as internal, described with suggestive similarity: the newly-sighted experiences external objects "in his eye" or they "touched his eye."⁶ In addition, reports by other people new to sight do not confirm Cheselden's report (von Senden 1960). In the history of Molyneux's question, even actual people with blindness become hypothetical (Kleege 2005).

Georgina Kleege, famous for her memoirs on her own blindness, argues in her essay, "Blindness and Visual Culture: An Eyewitness Account," that Molyneux's question is "the most detailed depiction of the 'Hypothetical Blind Man (HBM)'," a kind of "Q document" cobbled out of philosophical theory and anecdotal reports of persons with blindness *by* persons with sight within a culture of "ocularism"—a culture pervaded by the assumption that to see is to know (Hughes 2010) and that persistently views people with blindness—a simple physical difference—with "otherness" (Kendrick 1987).⁷ People with blindness must perceive differently because they are a different kind of person, and in some cases they are not even viewed as a person.⁸

I grant that more needs to be said to substantiate Kleege's point and my mistrust of Cheselden's report, but I think an initial identification of potential reporting bias on people with blindness carves out enough evidential space for hearing out the testimonies of actual people with blindness. In addition, disability activism and its "nothing about us without us," motto has given greater currency to the identity and way of life of people with disabilities as *they* tell it, along with emphasis on the uniqueness of each disability.

Let me be clear about *listening* to testimony. A most influential paper on Molyneux's question by Gareth Evans (1985) is the first to quote a direct report by a person with blindness, Pierre Villey (1930). However, Evans gives "anecdotal" status to this report and neglects the ocularist context that Villey confronts in his text, a failure I intend to correct here. Similarly, we find a most recent paper on Molyneux's question asking if Villey's report is "credible."⁹ These are not cases of listening to people with blindness, and they contribute to this history of testimonial injustice. To see why, I next consider a dilemma for accepting the testimony of people with disabilities in general—the testimony of those viewed as marginalized "other." Another person with blindness who I read as presenting this dilemma, Thérèse-Adèle Husson, contains a kind of answer to Molyneux's question, an answer by a person with blindness who is fully aware that their answer has no merit to people with sight.

Husson's "none" answer to Molyneux's question

Thérèse-Adèle Husson, a woman with blindness, never mentions Molyneux's question by name in her memoir. Yet she taunts hypothetical interviewers with sight who, we might imagine, are posing the question, interviewers who also assume she lacks comprehension of spatiality and shape:

We [people with blindness] know full well that a chest of drawers is square, but more long than tall. Again I hear my readers ask what is a square object! I am accommodating enough to satisfy all their questions. Therefore, I would say to them that it is easy enough to know the difference between objects by touching them, for not all of them have the same shape. For example, a dinner plate, a dish, a glass can't begin to be compared with a chest of drawers, for the first two are round, while the other is hollow; but people will probably point out that it is only after having heard the names of the articles that I designate that it became possible for me to acquire the certainty that they were hollow, round, square. I will admit that they are right, but tell me, you with the eyes of Argus, if you had never heard objects described, would you be in any better position to speak of them than I?

(Husson 2001: 41)

Her tactile identification of traditional Molyneux-like shapes, squares and circles, along with an account of how, and skeptical meanderings about this identification, signal that Husson is responding to Molyneux's question.¹⁰ Perhaps Husson's sighted hypothetical interviewer is the popular Kantian philosopher Ernst Platner (1793), who, thirty years prior, denied that people with blindness can have tactile notions of spatiality, as I discuss below. But it is Husson's allusions to her possible metaphorical use of shape terms that is of interest here, another claim made famous by Platner who claimed that shape terms such as "cube" and "sphere" had meaning only to people with sight as people with blindness could only sense shapes in a *temporal* succession of felt points or smoothness (quoted in Hamilton 1860: 174).

Husson's response exemplifies a dilemma of testimony. She cannot "prove" to her accusers that her use of shape terms includes spatial concepts. Also, to her accusers, shape terms *are* "visual" in the seeing public's use of them and thus privileged to those with vision.¹¹ However, there are no other words that better characterize Husson's own shape perception. This produces a kind of explanatory bind caused by what Fricker has called "hermeneutical marginalization" (2007: 155), where prejudicial assumptions of a group play a fundamental role in interpreting the experiences of that group in a way that confirms their prejudice.

If a person is viewed as “other,” either in mental ability or sensory acts of perception, then it is expected that their meanings are incommensurable with a person viewed as “normal,” people with sight who constitute the majority population and power. Thus, any terms shared in common between people with sight and people with blindness can be interpreted by people with sight as mere metaphor by people with blindness. Any attempt by minority peoples to speak to the truth of their experience by virtue of demonstration is futile, as any experience can be charged with “otherness.” People with blindness are perceived as syntax simulators, like the translator in Searle’s Chinese room, who produces the appearance of understanding Chinese by translating words according to symbol-manipulating instructions but does not really know the meaning of the Chinese words. While it does seem plausible that some aspects of sight really do have their own language, such as color terms (as will be discussed below), the *spatial* aspects of vision in question are multilingual according to Husson, though her testimony is not viewed in this context (and she knows it!).

This is, as I take it, the first case of a “none” answer to Molyneux’s question. Husson here can be interpreted as claiming that Molyneux’s question fundamentally privileges people with sight. Molyneux’s question is meant to be asked *of* people with sight *about* people with blindness—it is for visual culture alone, a culture she confronts.¹² Husson’s answer is that Molyneux’s question cannot be answered by a person with blindness—it is not that the newly-sighted might or might not identify visual shapes known previously by touch—it is that only a person with ocular identity can give a meaningful answer to the question.¹³ Husson thereby answers, “none,” grounded on the context of her identity: a person with blindness who is fully aware of their own marginalization.

In response, we might ask how one might unburden themselves from having “other” status? But such a question betrays our own privilege. The question has a flip side: How does one unburden themselves from privileged status, in this case from “ocularism”? Hermeneutical marginalization is not a problem with people with blindness, though it is a problem *for* them in that they are disenfranchised by it. It is a problem with people with sight who cast blindness as a meaning-altering deficit, a view that continues today. In a recent debate over the nature of sight and blindness, Milligan, a person with blindness states:

[T]o express the passion, the zeal of a missionary preaching to the heathen in outer darkness. Only, of course, your “gospel” isn’t “good” news to us heathens, for the message seems to be that ours is a “darkness” from which we can never come in—not the darkness of course that sighted people can know, but the darkness of never being able to know *that* darkness, or of bridging the vast gulf that separates us from those who do.

(Magee and Milligan 1995: 46)

Milligan goes on to accuse his counterpart to being a “visionist” about human nature, believing that vision is fundamental to one’s humanity. This claim is situated in a familiar debate about disability as “difference” or “deficit.”

“Difference” or “deficit” both imply marginalization: if “deficient” because sight is missing or “difference” due to a unique sense-field, people with blindness remain “other.” This standard distinction is driven by a structural prejudice meant to isolate a specific group from having currency in “normal” discourse. When people with blindness volunteer their thoughts, many claim a third option: a preference for blindness. Husson’s remarks are such, commenting on her expertise in an important social good of educating people with blindness, a way of being that she interprets as perhaps more credible than being a person with sight: “I prefer my touch to

your eyes, because it allows me to appreciate things for what they really are, whereas it seems to me that your sight fools you now and then" (Husson 2001: 25).

New work on the philosophy of disability by Barnes (2016) advocates for this third way of self-defining disability. Disability is neither different nor deficient and thus not "other," but "*merely* different," neutral in value and open to being bad or good as judged only by the person with disability. The condition of people with disabilities is one of having a "minority body"—in the case of blindness, a minority sense-field. Husson's positive value to being a person with blindness, for instance, can be fully justified as "adaptive preference" (Barnes 2009). From the basis of having a "minority sense-field," as it were, people with blindness like Husson require a reconsideration of their testimony that was previously undercut by a history of testimonial injustice. The basis of past judgments on people with blindness as "other" was grounded on a-priori assumptions about what is bad or suboptimal as influenced by ocular bias, societal stereotyping, and sensory prejudice. We combat these assumptions by considering direct testimony of people with blindness without the context of deficit or difference. Let's turn to Villey's testimony.

Villey's "inverse question" answer to Molyneux's question

Villey, a scholar of Montaigne, among other early modern figures such as Locke, provides the most comprehensive memoir on blindness. Villey's motivation coincides with the various injustices noted above: "The blind are victims of the ignorance of the public concerning their real condition. By explaining some of their psychology, I am helping to defend them against the prejudices which are the chief barrier to their professional activity" (Villey 1930: 9).

Villey's particular aim is to correct the philosophers, such as Platner, who claim people with blindness lack spatial concepts by confronting their theoretical assumptions:

The blind are singularly surprised when people talk to them of philosophical theories which refuse them the notion of space, or which grant them a space quite different from that of those who have their eyesight. They are very much amused at this idea. Their amusement may be a sign of levity, or of high treason to philosophy.

(Villey 1930: 206)

Villey assigns the cause of these prejudices to fear of blindness, "The man who sees imagines himself struck suddenly blind" (1930: 15). Villey's crusade is not irrational activism but cautious, scholarly insight that draws from the testimony of many other people with blindness and anticipates many of the insights of Barnes (2016). People with blindness are not a "group" that is other from humanity.¹⁴ Each person with blindness is a unique individual with varying abilities, talents, and problems given their class, gender, education, and other societal strata. Some people with blindness are exemplary writers and thinkers, artists and leaders, while some remain illiterate, insulated, and alone, unable to achieve expected social standards, an inability due directly to their social situation not their sensory one, though a sensory situation of minority status in society that largely causes their marginalization.

The sensory situation of people with blindness is described by Villey as involving absence of distant and large objects, color and light experiences. So people with blindness rely on indirect reports to acquire knowledge of these things, a situation no different for the size and shape of the earth and astronomical objects for people with sight. Villey claims that the reports of spatial properties by people with sight, "can always be translated into tactile

language” (1930: 18). Space is meaningful to people with blindness just as it is to people with sight, sight for Villey being, “a long distance touch, with the sensation of color added. Touch is near sight minus the sensation of color, and with the sensation of rugosity added. The two senses give us knowledge of the same order” (1930: 19). Villey is careful to flag a caveat: the perspectival properties of shapes in visual perception are not available to people with blindness, an issue of some importance today.

Perspective and spatiality

Villey claims, “the notion of [perspective], one is dependent on the eyesight and I have never yet met with a person born blind who had a clear idea of this” (1930: 19). Examples include:

1. **Orientation:** When a person with blindness perceives a circular coin, no perspective dependent experience of an elliptical shape upon viewing the coin at an angle is possible as it is for a visual experience.
2. **Distance:** Tree sizes may be visually experienced as different given their relative distances from the perceiver, an orientation that is not possible for a person with blindness who must touch the trees in proximity to their reach, a reach that does not involve the optical laws upon which sensory perspective is based.

We might say that people with blindness lack a distinction between an object’s shape and size experienced from a single perspective, what some call P-shape and P-size (Jagnow 2012; Tye 2002) and the shape and size of objects that exist external to and independent from the perception.

The lack of perspectival concepts in spatial perception is a counterexample to the claim that perspectival experience is part of spatial perception (Green and Schellenberg 2017). Perspective shifts are a basis for the mind-independence of the objects. If an object’s shape shifts upon viewpoint changes by the perceiver and/or rotation of the object then the object is independent of the subject.¹⁵ But such is an ocularist argument, one that continues Platner’s assertion that people with blindness lack spatial concepts. To adopt such a position is to fulfill ocular preferences, anticipating a dominant account of disability known as the social model (Haslanger 2014), that society is organized in a way that disenfranchises certain types of people, including people with disabilities, without which there would be not disenfranchised people—there would not be people with disabilities. Analogously, people with blindness *are able* to read and write though by a different medium, a demonstration that shows for Villey that, “the intelligence of the blind is not only equal to that of those who see, but that it does not differ in nature, that it is not distinguished by any special characteristics” (1930: 30). Braille reading and nonperspectival perception is a mere difference, neutral in value. Though Villey fails to address this issue further, he claims that while both sight and touch bring unique contributions to a perception of an object, unique “contents” or something not representable, the perception of objects that sight and touch contribute to separately produces an object that is not different.¹⁶ “The essential fact is that the blind man, too, has at his service spatial synthetic images, images that are very supple and very mobile. He has what I should style a veritable *tactile sight*” (Villey 1930: 190).

I wish to follow Villey and move past the problem of perspectival perception for Villey’s claim of sameness between sight and touch and the spatial perception of people with blindness. This shift avoids repeating the privileged ocular-based argumentation of past philosophers. Let us put more consideration to Villey’s testimony as he expresses it.

Villey's question

Let's consider Villey's claims to spatial concepts by people with blindness in the terms provided by Villey rather than ocular philosophers and psychologists. This is likely Villey's own strategy, as he never mentions Molyneux's question by name—a move that, like Husson, seems intended as a correction to the question's ocularist history. More radically, Villey presents his own reverse statement of Molyneux's question (again not mentioning it by name to perhaps counteract the question's implicit ocularism), which essentially asks Molyneux's question from the perspective of a person with blindness. He asks a person with vision of *their* capabilities were they to lack touch and then acquire it:

Let us imagine a subject deprived from birth of the sense of touch and suddenly recovering it. He would, undoubtedly, be incapable, if he closed his eyes at the very moment of his cure, to recognise objects by touch which he had hitherto only know by sight. He could not explore them, and build up a representation of the whole, with his partial sensations.

(Villey 1930: 196)

Villey's reverse statement *is* his answer to Molyneux's question. Like Molyneux's, Villey's statement is in answer to the freshness of novel "innocent" experience (Foucault 1997).¹⁷ "What would it be like to touch for the very first time?"

Like Molyneux, Villey answers in the same breath: "not." The untrained tactile experiences of objects are insufficient to represent the objects as previously identified by sight alone. The newly tactile person could not even perceptibly explore the objects: the means by which they might learn to touch is "by very different means" (Villey 1930: 227) than vision. The newly tactile would need, through training, education, and repeated experience, to "learn, and often with great difficulty, how to co-ordinate their movements, to interpret them, and to build up with these elements a portion of space fast enough for practical needs and for the needs of thought" (Villey 1930: 228).

Villey leads the reader through difficulties for tactilely building up representations of objects: the object must be touched in the right way, felt from different sides in a way that connects both the feelings put to the skin's surface and the movements used to generate these feelings, movements that require fingers, the wrist, elbow, shoulder, and even entire body relative to the object's size.

After much time and training, the newly tactile implement effective movement exploration automatically, described by Villey as a kind of bike-riding know-how acquiring expert fingering like a pianist. The "automatism" of the movements, "escape the control of consciousness" (Villey 1930: 241), and come in two parts: one for general form and a second for detail, both of which entail active movement of the body around and on the object helped often by hearing (1930: 251). Yet, even with all of complex feel movements, the intellect's synthesis, and attentive memory, touch is, at best, "embrionic sight" (Villey 1930: 255), stressing the incompleteness of the tactile medium. We find a more complete description of Villey's view toward the rudiments of touch in an earlier section that provides a surprising twist.

Villey's view follows Locke's own claim that new visual experiences are rudimentary, lacking representational properties; new sight is not of external objects but rather of a pallet of colors (Bolton 1994). But, as Villey is quick to point out, sight is different from touch, in that the latter but not the former is fragmented and successive. Consider his analysis of perceiving a chair. "The eye takes it in at a glance and, in the shortest time possible, observes the

whole structure of it. The finger on the other hand explores all parts of it slowly and methodically” (Villey 1930: 184). The immediate experiences that sight and touch promote of the chair are thus distinct:

The outlines of the chair are determined for the eye by an impression of coloration, and it is the color which, immediately projected from the eye and objectized, marks, at every point, the exact frontier between the object and the surroundings in which it is placed. As regards touch, it is the impression of resistance which supplies the same limit, a complex impression, as we know, for it consist of the play of muscles and tactile nerves, and it is generally localized very distinctly in these organs.
(Villey 1930: 184)

A “play of muscles and tactile nerves” leads to feelings of resistance in terms of smoothness, some bumps, some edges and points felt in succession. Given this description, the vehicle of touch appears to be insufficient for spatial representation, but such an inference would confuse the contents of the perception with the vehicle, as I discuss below. Rather, as Villey testifies, these successive fragmentary experiences generate a more or less complete representation of the object:

The two orders of sensations appear then with very different modalities. But if, an hour after feeling it, I search my consciousness for the memory of the vanished chair, I do not, this time, have to think of each one of its staves. I do not reconstruct it by means of fragmentary and successive images. It appears immediately, and as a whole, in its essential parts, with its seat, back, four legs, and the staves which unite these. There is no procession, even rapid of representations, in which the various parts come and join themselves to each other, in the same order as for my first sensation, but with a speed a hundred or thousand times greater.
(Villey 1930: 184–185)

The mind, unconsciously, knits together the temporal fragments of the object into a spatially unified perception. Spatial perception is distinctive from the temporal sensory process, having neither order of sensory succession when feeling the object nor the muscular experiences directly associated with the sensation:

The chair suddenly appears to the consciousness, entire in all its parts. [...] I could not tell in what order the various parts were first perceived by me, and it is just as easy now to give details about them in a different order. The testimony of all the blind agrees on this point. [...] The blind man thinks no more about the muscles of his hand than the person who sees thinks about the muscles of his eyes.
(Villey 1930: 185)

Taking Villey’s passage as *reliable* testimony provides both a correction to past testimonial injustice and to a conflation of vehicle and content. The testimony demands an account of perception that fits this data, one that Evans was quick to attempt, though one that ultimately conflated content with vehicle by claiming that the muscular movement involved in touch had a basis of commonality with sight in that it was constructed out of bodily space—space that is involved in the activity of the perceiving. On this basis of commonality of vehicle between sight and touch, Evans concluded a commonality of contents between sight and touch (see Millikan’s criticism [1991]).

Villey's phenomenological analyses of tactile perception of objects result in a claim that perception is greater than the sum of its sensations—spatial experience does not entail spatial sensations as ingredient. One way to state Villey's final claim is to state that there exist "spatial experiences," or: SPACEX: experiences exhausted by spatial content.

SPACEX is available to touch after sufficient training, and similarly, vision. Following Locke's analysis of visual learning (1979: II.8), Villey presents further similarities in the process of acquiring SPACEX by sight and touch, processes that differentiate these vehicles from their contents:

For a man who sees, the image of a chair is, at first, merely a colored patch, like the image of a rainbow. With experience, though, thanks to the impressions of all kinds which group themselves around them, the two images take a different value. *A reality is perceived behind the coloured patch which represents the chair*, whilst that which represents the rainbow is only considered as a play of light. Resistance then is implied in the image of the chair. It is there, without being directly perceived, and without there being any conscious accompaniment of muscular impressions. It seems to be only given in a secondary way and as an accompanying impression.

(Villey 1930: 187, my emphasis)

The textural and resistance properties directly involved in the tactile sensations of objects are not present in the spatial representation of the object itself. Rather, these sensations must be conjured up and laid on top of the spatial structure as afterthoughts.

According to Villey, the cognitive processes by which SPACEX is made possible can also generate a variety of nonsensory concepts, including aesthetic synthesis. "The aesthetic emotion felt as a result of visual and auditory sensations is not produced by those sensations. It has its source much deeper within us" (Villey 1930: 307). Also, he interprets Helen Keller's memoirs as describing sensory experiences with nonsensory "moral qualities":

The tactile and olfactory qualities of persons have a faculty of evocation so great that she does not remember them: she forgets whether the hand was soft or rough and only remembers the moral qualities which she inferred from the touch; or, let us say, that she thought she recognizes in the persons.

(Villey 1930: 272)

Villey's arguments for the syntheses of sensations that lead to aesthetic, moral, and spatial representations in people with blindness follow a pattern where the fleeting sensations involved in touch dissolve away for more or less complete representations and are as much layers added on latter.

What are the cognitive processes that enable sense-based representations of object properties in SPACEX? Villey appears to anticipate some elements of Gibson's affordances. In commenting on persons with sight, he claims, "Visual images perform, in the psychical life, numerous functions of which the spatial representations we have just examined would be incapable. They are living, moving forces. [...] The sight of an apple awakes the appetite and the wish to have it" (Villey 1930: 263). Then, commenting on persons with blindness, "Why should touching the apple, the smooth, cool skin of which gives such a peculiar impression to the hand, not make the mouth water just as it would on seeing it?" (Villey 1930: 264). There is nothing about basic human needs and desire that privileges sight, so the properties that represent human needs and desire are not only visual. Could it be Villey's insights into the behavioral aspects of perception that initially led to Evan's own considerations along this line of thought, rather than those of Gibson, whom he cites as his inspiration?

What is the basis of Villey's claim to the "synthesis" of the spatial? The key premise of Villey's claim is that the synthesis of space is required for *both* sight and touch. Just as touch is informed by successive experiences of objects, so too is vision with its saccades through the visual field (Javal 1878). This equivalent set of conditions is emphasized by Villey's discussion of "symptomatic foveal blindness" (1930: 254), a condition where only a small portion of a visual field presents spatial form, requiring subjects to follow points, surfaces, and edges with eye and head movement, "just in the same way as a blind man builds up his tactile representations by following the edges of objects with his fingers, and by interpreting the movements of his hand. At this degree, sight is almost like touch" (Villey 1930: 254).

And, just as touch has diverse sensitivities in the fingers, hand arm, etc., so too does the eye: "In every retina there are spots more sensitive than others...the role of attention is to look round on the surface of the object in such a way as to make the various parts come into relations with the sensitive spots and to bring them into evidence" (Villey 1930: 255). To synthesize these various sensitivities and saccades, the eye must have help:

The memory must retain these successive impressions, in order to give to the synthetic image a distinctness, a richness, an intensity that it did not have at first. The envelope that the eye throws over the object, and with which it wraps it round, facilitates the action of the mind, but it does not do away with it.

(Villey 1930: 255)

Matthen has suggested a modern equivalent of Villey's "envelope," a digital touchscreen—not a sensory feature but rather a pre-modal structural framework provided by the mind that coordinates the nonspatial sensations into perceptual ones (Matthen 2014: 70).

With this, Villey concludes that vision as well as touch must synthesize the sensory impressions to create spatial experiences. "In this way, sight appears as an improved touch" (Villey 1930: 255). He also revises ways of comprehending this process by people with sight, including abandoning the term "image" for "scheme," a word that emphasizes the functionality of the senses and their role in an active life rather than a sensory one. If so, then Molyneux's question must be more inclusive in its method of identification, one that should include behavioral aspects.¹⁸ Take, for instance, a most recent case where five minutes after the post-surgical eye path was removed, subject YM, a three-year-old girl born blind, identifies the familiar shape of her hand: "She then raised her left hand and showed great excitement upon seeing it. She repeatedly hid the hand behind her back, brought it out to look at and hid it again" (Chen et al. 2016: 1069). It is not an "image," in the visual "static" sense, which led to YM's identification of the hand, but a "scheme" or structure that responds to a variety of inputs and correlates them into a stable cognitive concept for purposes of identification and use. Perhaps if behavioral ways of identifying shapes were points of interest in Molyneux's own stated question, errors of the past may have been identified more quickly. But such was not the case, as evidenced by Platner's rejection of spatial representations in people with blindness.

The classic view

Platner concluded that: "The sense of touch, by itself, is altogether incompetent to afford us the representation of extension and space. [...] [A] man deprived of sight has absolutely no perception of an outer world, beyond the existence of something effective, different from his own feeling of passivity" (Hamilton 1860: 174).

Platner's claim and its continued development throughout the nineteenth and twentieth centuries was called "the classic view" by Millikan: "The classic view (is) that the blind cannot perceive space, this because the parts of an object can only be touched in succession, and because successive touchings could not yield a perception of the object's simultaneous spatial layout" (1991: 443). We might state the classic view as follows:

- 1 To conceive of the spatiality of an object, one needs to experience an object simultaneously.
- 2 People who have blindness cannot experience an object simultaneously.
- 3 Thus, people who have blindness lack the concept of spatiality.

Consider again the logistics of perceiving an object by senses other than sight: touch, sound, smell, and taste, among others, connect us with an object's properties in a way that can only be sensed one at a time. Evans describes this as follows:

When a blind man traces the outline of a square—e.g., by tracing the edge of one face of a cube, or a wire figure—he receives just such a sequence of impressions, and his concept of *square*, though it is abstract, and can be applied, for example, to the arrangement of houses in the village, remains the concept of a certain kind of *succession*, like the concept of a *fugue* or a *tune*.

(Evans 1985: 321)

To have a concept of spatial object (a concept of space), more than one property of an object must be sensed at a time. Thus, those without sight—those who only have the senses of touch, sound, smell, and taste—do not have the concept of space.

Because the shapes of a cube and sphere *could not be* familiar to touch by people with blindness, it is not possible for the newly-sighted person to identify these "tactilely unfamiliar" shapes at first sight, a basis for a "not" answer to Molyneux's question. Platner continues, "This form of sensibility, as Mr. Kant calls it, and which, in a certain signification, may very properly be styled a pure representation, cannot come into consciousness otherwise than through the medium of our visual perception" (1793: 175). Platner suggests here that the structure of vision provides a unique basis for spatial concepts, and, conversely, the structure of touch provides a unique basis for *temporal* concepts. "In fact, to those born blind, time serves instead of space. Vicinity and distance means in their mouths nothing more than the shorter or longer time" (Platner 1793: 174). There exists, then, a world of people with sight who spatially structure their world and, independently, a world of people with blindness who temporally structure their world, according to Platner, among others.¹⁹ Lotze (1887) likewise claimed that people with blindness had only temporal concepts of "movement, time and effort," and von Senden (1960: 285–286) agreed that without vision, concepts "must be mentally strung together in time. A spatial line must be replaced by a temporal sequence."²⁰

Spatiality, on the classic view, is dependent on a simultaneously unifying experience that only the visual field provides—vision takes in an entire scene at a time. People with blindness, by contrast, experience external objects successively over time, one part at a time, and thereby lack the input necessary for a unified spatial field. A person with blindness feels the edge of a cube in sequence, and it is the one-after-another temporal experience that constitutes an edge concept for a person with blindness. Yet even Platner recognizes that people with blindness behave as if space was meaningful by, for instance, identifying cube and spherical shapes.

Platner explains that this ability does not imply spatial meaning: “the varieties of impressed feelings ... the cube, by its angles, affected his feeling differently from the sphere” (1793; cited in Hamilton 1860: 380). As only the *affect* of the square’s angles distinguishes it from the smoothness of the sphere, there is no form perception when identifying the shapes. Even if a person with blindness communicates their identification using language of spatiality, it is an identification that employs a “deceptive” use of “language accommodated to vision” (cited in Hamilton 1860: 380). Again, Husson’s own response to her hypothetical interviewer may have Platner or one of his disciplines as a target. One of these disciples, William Hamilton (1860), who both translates, quotes, and ultimately agrees with Platner’s assessment, adds a thought experiment in support of Platner’s affect interpretation: a darkened room would be unidentifiable by a sighted person, even if they “grope about for hours—he may touch and manipulate every side and corner of it” (1860: 381). The dark room, or even a blindfold, occludes the “spatial sensitivity” of vision, inhibiting access to its spatial properties such that the space of the room remains meaningless, only filled with the bonks and bangs, smooths and sharps of the tactile “inner” world.²¹

Hamilton adds that were people with blindness able to acquire spatial meaning—were they to gain sight, they *would* identify shapes by sight—“on first perceiving [shapes] by sight, be able to discriminate them from each other” (1860: 177). Hamilton signals this move by breaking with Platner over the claim that a person with blindness could not have knowledge of geometry, distinguishing between “empirical” notions of space which would remain unavailable to the person with blindness, allowing acquaintance with “pure or a-priori space.” In other words, while people with blindness are “other” perceivers, they are not “other” thinkers, as Platner contends. This claim is based on Hamilton’s familiarity with the blind geometer Nicholas Saunderson, discussed extensively by his mentor Thomas Reid (1764).²²

A general problem with the classic view

It is not clear why or how the newly-sighted would fail to identify the shapes by sequential visual attention to the parts familiar to persons with blindness, foveating over the points, edges, and surfaces. If the classic view allows for a type of perception of spatial form that includes a temporal form, then what makes that temporal form inaccessible to sight? Is it that sight is *only* a spatial sense with no temporal ordering? Or is it that this kind of answer to Molyneux’s question dodges the fundamental question of spatial performance? If so, then what makes the spatial aspect crucial other than the pervasive ocularism in which it is embedded, an ocularism that this chapter wishes to rectify. Indeed, it seems that the central issue of Molyneux’s question, if authorial intent is somehow deified, is that if touch and sight are homogenous, they are so in some dimensional structure, whether that be time or space. It was Molyneux’s own view that there were no dimensional structures that could cross-modally transfer. But, given this specific possibility of shape identification by way of temporal orderings, is it not possible that temporal structures transfer?

Millikan claims that Molyneux answers generally conflate the sensory vehicles sight and touch with the contents of sight and touch. Millikan refers to this as the “passive picture theory”: whatever object the mind receives is exemplified by the mind—“content internalizing/content externalizing.” The properties of the vehicle transporting content to the mind are adopted—externalized—as part of the contents being transported. As others, like Evans, put it, answers to Molyneux’s question tend to conflate the content of the tactile shape experiences—the properties that the experiences are of—with the intrinsic qualities of the experience itself. It is an old problem, one that Hume makes when conflating succession of representations with the representation of succession itself.

Following up on Millikan's point, what's to say that space is an object property rather than the condition, as Kant argued, for having object properties structured spatially? In other words, space seems to be more than a mere sensory dependent property of objects. Hamilton hinted at this notion by breaking with Platner over the possibility that people with blindness could have pure or abstract spatial concepts. But it is not clear why empirical spatial content is dependent on sight alone. It seems possible and fits with my own experiences of objects, that one could have spatial content that lacks sensory content altogether—that is exhausted by SPACEX. Certainly, some experiences of object properties may lack sensory experience altogether only having structural or spatial properties. Thus, it is possible that some visual experiences of shape are colorless and some tactile experiences of shape are resistless and/or textureless—they are simply spatial “schemes.” SPACEX is a mutually exclusive option to Platner's claim, a claim that conflates vehicle–content distinction and makes an egregious generalization from an interpretation by a sighted person of a single person with blindness to all people with blindness.

The possibility of SPACEX has been advocated by some of the philosophers who have defended an affirmative answer Molyneux's question, including Leibniz (1760) and John Campbell (1996). For, if SPACEX is possible, then there are grounds for the content of concepts having only spatial properties, allowing for their applicability in tasks like recognition to be unconstrained by the sensory modality by which it was acquired. As Campbell concludes:

I think it is fair to say that the current philosophical literature on Molyneux manages only to point, in one way or another, to the sameness of the collections of dispositions that are associated with the shape properties we ascribe on the bases of sight and touch. [...] We need to know that our phenomenal experience in sight and in touch confronts with just the same categorical shape properties, in just the same ways. And so far, that question is still wide open.

(1996: 219)

SPACEX provides categorical, or experiential, grounds for the sameness of experience when touching and seeing shape as it is based on the sameness of the content that is picked up by the senses of sight and touch, being picked up in the same way, i.e. experientially. It is, in effect, an attempt to ground an answer in the claim that the relation between the experiences of sight and touch is one of sameness not difference.

To advocate SPACEX is not to deny that there are sensory experiences or sensory content. Many of our experiences have sensory content, just not all. Platner and others claim that all our experience is “filled in” with the various qualitative features generated from the properties to which each sense is tuned with the vehicle's properties. On the other hand, SPACEX claims that even though the only way we might experience an object like a ball is by touching or seeing it, this does not entail that our experience of the ball includes its being textured or colored in. SPACEX claims that we might experience the ball as a sphere, full stop, even though it is by sight and the color properties that sight is tuned to that we experience the ball. For example, I might pick a tomato off its vine and in touching the tomato experience only its shape properties, its sphericity, without experiencing the smoothness of its skin or its relative pliability in my grasp or any other related sensory content. The content of such spatial experience would be completely devoid of sensory content—devoid of any of the properties of objects which a given sense like the sense of touch is particularly tuned, a claim that I find to be present in Villey's analysis of perception by touch.

Conclusion

This chapter addressed one basis for perceptual accounts of the external world: the unity of sensory experience, a criterion most often associated with vision. But it is not the unity of sensory experience alone that led to Platner's claim that people with blindness lack spatiality due to the medium of touch being confined to successive fragmented input. It was also a failure to distinguish sensory mediums from their contents, one that could have been corrected with sufficient attention to the testimony of people with blindness who both spoke and behaved in ways correlated with spatial representation, as this paper attempted to show.

The consideration of two answers to Molyneux's question by actual people with blindness demonstrate that Platner's "classic view" is false and that people with blindness are not objects of study but rather subjects in and of themselves. This is a beginning to distancing philosophical analysis from the "hypothetical blind man" familiar to philosophers: Descartes's crossed-stick man, Molyneux's cube/sphere man, Diderot's "blind mathematician" Saunderson, with the real person with blindness, which includes such luminaries as Husson and Villey.

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Notes

- 1 I define blindness as an inability to visually experience spatial form (Land 2002). Throughout this chapter, I will refer to such subjects as "people with blindness" to emphasize a unique condition that some with the condition disclose and identify with as "blindness." I will not be referring to "the blind" or "blind people," terms that emphasize disability over personhood.
- 2 As Kleege notes, "What these blind authors have in common is an urgent desire to represent their experiences of blindness as something besides the absence of sight" (2005: 188).
- 3 Though not born blind, Husson lost vision from a bout of smallpox at nine months of age.
- 4 Note that Reid (1997) also does not mention Molyneux's question by name, though he is frequently read as presenting an answer to Molyneux's question.
- 5 The bias of Cheselden's report may have been countenanced first by Dugald Stewart (1854: 295), "there are come *expressions* ascribed by him to his patient, which must, in my opinion, be understood with a considerable degree of latitude."
- 6 This is also a fallacy. Seeing distance and attributing externality are distinct. We have to, for instance, refer to an object as being "out there" in the external world before taking it to be "over there" in the distance, and cannot reasonably deny external attribution by denying distance perception.
- 7 Original phrase in Gitter (2001).
- 8 Both Platner and Hamilton, and even Diderot, in his memoir of the "blind mathematician" Saunderson took people with blindness to lack morality: people with blindness have "no high thought of their humanity" (Diderot 1999: 156). Both Platner and Hamilton reason that because people with blindness cannot see murderous acts, or other morally contemptable behavior, they do possess adequate moral concepts, a claim directly disputed by Hellen Keller (see below).
- 9 Matthen and Cohen (forthcoming).
- 10 Note that while this report is uniquely self-referential, a testimony of Husson's own experience, she means it to be generalized as evidence of spatial concepts in people with blindness.
- 11 Laura Pugno, an Italian artist, confronts viscosity of shape in her installation *Il Quesito di Molyneux*, April 28, 2016, GAM, Torino. "Pugno's answer to this problem starts from the observation that 'a shape' is traditionally meant to be visual. By challenging this received notion, her sculptures attempt to investigate a tactile shape, namely a shape that disregards sight altogether. In these works, Pugno sought to forget her knowledge of the visual shape of the two objects. She tried to touch them as if for

- the first time, trying to reconstruct a pure tactile condition. It is this condition that makes any new tactile experience of the same object something unique: an infinite wealth as opposed to the relative fixedness of visual shapes." See <https://albertopeola.com/en/exhibits/87-form-in-progress> (accessed December 2, 2018).
- 12 Husson's confrontation of visual culture continued among the literati in France. See Jay (1993).
 - 13 Note, for instance, that it is not until a person with blindness acquires sight that they are asked identify shapes.
 - 14 To be clear, Villey does discuss people with blindness as having a similar psychological makeup; quoting above, "their psychology." I think this shows a degree of carelessness on Villey's part, as he both identifies people with blindness as a group and also denies that they are homogenous, people with blindness constitute a spectrum of differences, distinguishable by a variety of variables such as education, the cause of their blindness, and individual aspirations. However, it may also be the case that Villey is "grouping" in a way similar to other disempowered identities, allowing them to gain strength as a political and social force in society, despite these significant differences. Thanks to James Trent for this point.
 - 15 Note that, ironically, it is because of a lack of perspective dependence that Berkeley first claims that touch is the only sense that can acquire spatiality as only touch has direct access to objects without intermediary appearance shapes (1963).
 - 16 Block appears to adopt differences in representation across the senses, stating, "Quasi-representation-
alists [hold] that there are differences between sense modalities that cannot be cashed out representationally. One modality is flashing lights, another is tooting horns. But quasi-representationalists agree with representationalists that *within* a single modality, all phenomenal differences are representational differences" (2003: 37). Byrne (2001) includes this view as well.
 - 17 Foucault calls Molyneux's question "one of the two great mythical experiences on which the philosophy of the eighteenth century wishes to base its beginning" (1997: 65). For more on this, see Paulson (1987).
 - 18 The concern is also expressed by Ghazanfar et al.: "[N]eural representations across the brain may be centered on specific actions. This view on neural representations puts 'Molyneux's Problem' in a new light. Unisensory signals are fused into multisensory motor representations unified by an action, but since Molyneux does not suggest any action, his 'problem' may be better viewed as an ill-posed question—at least from a neuroscientific perspective" (2008: R1143).
 - 19 The classic view is post-Kantian. Though Kant himself claimed that spatiality was not dependent on sight, arguing that space is "pre-modal" (Matthen 2014) and is anticipated to have answered Molyneux's question with a "yes" (Sassen 2004), the distinction between the spatial and temporal, and its correlations with the external and internal, respectively are found in Kant's *Transcendental Aesthetic* of the *Critique of Pure Reason* (1965).
 - 20 See Evans (1985) for continued discussion of the classic view.
 - 21 I do not find this argument persuasive. However, it does capture Villey's own claim that touch requires training to effectively explore, reflect, and finally synthesize spatial features by touch. Hence, it is likely that Villey agreed with Hamilton's assessment, one that discounted the possibility and importance of education.
 - 22 Reid himself presents, like so many other philosophers, a hypothetical "Saunderson." Ryan Nichols' recent discussion of Reid's consideration notes this difference: "Reid imagines an idealized agent who possesses all of Saunderson's skills and more, and who is blind from birth; I will use 'Saunderson' to refer to Reid's idealization of Saunderson" (2007: 258). It is unlikely that Hamilton made a similar distinction, believing the hypothetical to be real.

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PART VI

Problems of perception in contemporary philosophy

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INTRODUCTION TO PART VI

Brian Glenney and José Filipe Silva

[P]arts of experience expose us to error, yet we do not say that in them is no truth. We see trains moving at stations, when they are really standing still, or falsely we feel ourselves to be moving, when we are giddy, without such errors leading us to deny that motion anywhere exists. It exists elsewhere; and the problem is to place it rightly. It is the same with all other illusions of sense.

(James 1979: 106)

By all appearances, the philosophy of perception has its own set of perennial problems and questions, a long and varied tradition, as well as signature authors whose work constitutes a kind of canon, if you will. Yet philosophy of perception is not its own recognized area of study in philosophy today, viewed largely as a subset of philosophy of mind or epistemology, though some have argued otherwise (Nanay 2010). The study of perception in psychology, where entire labs are dedicated to the research and teaching of sensation and perception, might help explain why. The history of the study of sensation and perception in psychology is taught as involving this same set of authors and works that philosophers study, with much of the metaphysical and epistemological questions flattened out, emphasizing rather the experimental and theoretical issues in perception itself. It might just be that the study of perception is housed in psychology. Note too that this research in psychology is frequently cited in philosophically oriented papers on perception. So, what does the contemporary study of perception in philosophy contribute? Another way of asking this question: what *is* the study of the philosophy of perception?

While psychology has diverted much of the energies of its past study toward new empirical discoveries, much of which the philosophical study has benefited from, philosophical study still considers the metaphysical and epistemological questions in full relief. What is the object of perception? How does this object contribute or detract from our knowledge of the external world? What role do concepts play in perception and must they play a role in every instance of it? What is the nature of perceptual experience? And how is it that experience is always *of* something, directed at something outside the experience itself? Notice that there are few experimental analogues to these questions, providing an ideal landscape for philosophical methodology to pick apart and digest.

Of all the historical periods surveyed in this volume, the most challenging to introduce is probably the contemporary one, due to the unmatched attention perception has received starting in the last decades of the twentieth century. As Nanay (2010: 3) recently put it, “Perception, at present, is as central a philosophical subfield as it gets,” resulting in an inter-twisted array of philosophical views on offer: almost all philosophers have something to say on perception. One way to restrict the field is by considering perception from the point of view of its problems, but then the first question to ask is, to paraphrase a recent scholar, “*what problem of perception?*” (Smith 2002). For some, like Smith himself, that question is “whether we can ever directly perceive the physical world” (2002: 1), that is to say whether we are through perception directly acquainted with mind-independent physical objects in the world (supposing one can agree on what counts as “objects”) or primarily acquainted with representational contents of that experience. In other words, the focus is on perception as the source for knowledge. Similarly, for Nanay, the most important question is “whether, and in what sense, perceptual states could be considered to be representations” (2010: 5). For others, like Travis, the question is rather “how can perceptual experience have bearing (rationally) on the world for the perceiver on what he is to think and do” (2013: 3). In other words, the focus is on the relation between perception, sensation, and cognition, and between perception and action. But these are just two ways of formulating an incredibly multifaceted issue. (Or set of issues, or sets of issues, or sets of sets of issues; ... the reader gets the point!)

In addition, many of the contemporary debates are drawn in accordance with disciplinary lines with solutions proposed and arguments advocated often transitioning from one to another without the necessary qualifications. One example of this can be found in the debate over whether there is cognitive penetration of perceptual experience, or whether higher cognitive states (beliefs, desires, etc.) play a role in the processing of sensory information and the content of perceptual experiences. Interesting as the general formulation of the problem is, the issue is found to be quite misleading unless the moment of the process of visual perception is qualified as of early or late vision (this is often expressed in terms of the 2½D and 3D sketch levels in Marr’s theory of vision). Recent studies show that it makes no sense to even raise the issue when early vision is the concern, taking place in the first 100 milliseconds after stimulus onset, because this is a largely automated process encapsulated by other downstream cognitive functions.

Cognitive penetration is thought to be an issue to be decided by cognitive science rather than philosophers. The debate can then be specified as applying to what happens next down the cognitive stream, but even here there is clear disagreement on how to interpret the existing empirical evidence. A recent study by Firestone and Scholl (2016) has attempted to refute the key arguments and core evidence for the top-down effects of cognitive penetration and was immediately followed by a backlash from those committed to cognitive penetration models of perception. Thus, it can be argued that interpreting the empirical data is rather a matter for the philosopher. (Whether or not an experiment can be designed that allows us to decide between the possible interpretations is a matter equally open to dispute.)

In very general terms, perception is a form of acquaintance that is exercised in sensory modalities under certain conditions, with questions arising about what is perception acquaintance of? And if not of external physical objects but some internal representation, what is the relation between the two? Or in more general terms, what is the relation between the sensory stimuli and the world as we perceive it to be, which may or not include filling in or inferential reasoning, etc. Finally, what properties of things can be represented in perceptual content? What is the number and the principle of determination of those sense

modalities and what are the standard conditions under which veridical (and by exclusion, nonveridical) perception occurs. How to formulate precisely each of these questions and the possible alternative answers to these questions is a matter for philosophical dispute. To name these different options would not be helpful here, but there is an array of substantial overviews that serve the reader well.

These questions gain traction, as our volume suggests, by identifying global and local problems that have a long history in the philosophy of perception. For instance, the object of perception can be considered by asking whether spatial perception is learned or innate, a problem largely inherited from Locke's discussion of whether we immediately see 3D objects or whether we must learn to see them. As discussed in the prior introduction of the post-Kantian period, we cannot rely on our intuitions, themselves biased by cultural peculiarities like ocularism that privileges visual access. Experimental work in the late twentieth century has provided an astonishing view into the black box of perception, revealing among other things the concept of plasticity—that our brains are hardwired to adapt to diverse sensory input.

One significant technological breakthrough in the study of plasticity applied to perception, sensory-substitution devices (SSDs), is discussed by Michael Paterson in terms of what kind of perceptual learning might be involved:

In particular, the kinds of historically recognized functional analogues between vision and touch, when facilitated by recent generations of SSD technology, are now explained in terms of brain plasticity, as adaptation to these technologies requires fast perceptual learning and, over the long term, substantial cortical remapping.

(p. 340)

The process of perceptual learning of 3D objects *is* innate, providing a substantial reconciliation of the nativist debate while also suggesting that the immediate object of perception is in fact 3D, in that we are consciously aware of 3D spatiality even though we unconsciously process 2D spatial information. In what sense, however, is “fast perceptual learning” something that can provide knowledge of the external world? After all, 3D objects require a degree of judgment that, for Locke, involved some notion of the intellect. (For Leibniz, the intellect was crucial in this process.) Such is the related problem of perceptual judgment, the fact that our intellect *must* influence how we experience the external world, but one that is fraught with bias; one that is like a “veil,” if you will.

In her essay, Josefa Toribio argues that perceptual judgment is not a veil but rather offers a hybrid interface between perception and cognition that is “effortless, automatic, unintentional and stimulus-driven—just like perceptual experiences” (p. 301). Consider her example that seeing a red tomato in a supermarket aisle requires no reasoning nor belief or assent of some red tomato truth. As she states, “Perceptual judgments occur without us realizing it. They are not something the subject does, but something certain sub-personal perceptual mechanisms do” (p. 301).

But things cannot be *that* simple. The visual perception of the red tomato by a novice is surely different than that of an expert, who might even identify the species, ripeness, and perhaps even fitness for taste in a pizza sauce. She writes, “The novice's and the expert's visual experience ... is exactly the same. But only the expert, to whom we grant the recognitional capacity brought out by the dedicated perceptual system that produces the relevant seemings, has an overall experience” (p. 303). In other words, both are appeared to

in a similar way, but what each observer does with that appearance is different in accordance with how their sensory system is trained. But what of observers who are not human and do not possess complex categories such as “red-tomato-most-fit-for-pizza-sauce?”

Animals, for instance, fail to have such gourmet considerations, or at least from what we observe of our closest animal friends, dogs (though they do seem to have a predilection for rotting fish and the like). Dogs, however, seem to be incredibly good at distinguishing smells from a distance. Clare Batty’s essay finds that the complexities of smell are drawn out by comparing human and animal olfaction. As she writes:

We might think that the sniffer beagle is exceptionally adept at discriminating target odors from others in the “odor soup” at their noses. The question then, is: are animals better than humans with respect to these kinds of abilities? As it turns out, the question isn’t that simple, nor is the answer what we might expect.

(p. 329)

In fact, Batty provides two crucial axes of comparison between species: sensitivity and discrimination, presenting new findings that, “we have a higher sensitivity than dogs in five of fifteen odorants. These odorants (e.g., n-pentyl acetate and β -ionine), Laska tells us, are components of plant odors and, as a result, likely do not have ecological significance for dogs” (p. 332). So, even though it does not seem that smell is crucial to human sensory activity, it does appear that we are quite sensitive to smells in comparison with even the best smell discriminators relative to smells that have greater import for human survival.

Vision is by far the most developed human sense, as evidenced by the almost complete visuality of “social media” that has fundamentally shaped contemporary human society. Two billion digital pictures are uploaded daily, objects of vision that did not even exist fifty years ago. Our insatiable consumption of these images is curious and appears to be so dominant that we seem to enjoy pictures, particularly pictures of ourselves, more than actually seeing objects for themselves. But what exactly is it to see a picture? Gabriele Ferretti’s essay explores picture viewing as distinctive, stating: “There seems to be, undoubtedly, a crucial difference between seeing a flower in a picture and seeing it face-to-face: only the latter offers our visual experience the visual feeling of presence ... *when facing a depicted apple, the same spatial and motor relations we can entertain with a real apple*” (p. 308). In other words, what is it about a picture that distinguishes it from the object being depicted?

Ferretti is not the first to claim that we must see the object and the picture when viewing a picture, or more specifically we see a 2D surface of the picture. But how is it that we seem to be unaware of the picture’s surface while also being aware that it is a picture we are viewing? Ferretti’s conclusion relies on Freud’s own distinction between the conscious and unconscious, writing, “in pictorial experience, we consciously see the depiction while unconsciously seeing the surface” (p. 312). To see a picture is to be consciously aware of an object that is processed by the visual system in a way to includes surface properties without the viewer being attentive of them. Perhaps such a claim can help us understand the more curious rabid consumption of these 2D visual objects.

These essays on contemporary topics in the philosophy of perception portray its study as something distinct and rather removed from philosophy of mind or epistemology as argued by Nanay (2010). It appears that much of the topics are local to perception itself: more concerned with the nature of the perceptual process and what constitutes the object of perception than how this benefits an understanding of mind or knowledge. And while the methodology of these papers includes consulting with literature in the cognitive sciences,

the claims made are metaphysical: what *is* smell, what *is* perceptual consciousness, what *is* the process of perceptual judgment, among others. Perhaps these essays, then, provide further evidence that there is a philosophy of perception.

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16

VISUAL CATEGORIZATION

Josefa Toribio

Which properties can feature in visual perception? Can we see the sadness on other people's faces? Can we really see that the tree in front of us is a pine tree? The key question here is whether when it seems to us that we see a high-level property such as being sad or being a pine tree, the what-it-is-like of these experiences, their phenomenology, is genuinely sensory or perceptual phenomenology.¹ Properties that count as high-level include, but are not limited to, natural kind properties (e.g., being a pine tree), artificial kinds (e.g., being a bicycle), dispositional (e.g., being breakable), emotional (e.g., being sad), moral (e.g., being virtuous), and aesthetic (e.g., being beautiful) properties. No one denies that things can visually *seem* to us as having high-level properties such as being a pine tree, being breakable, being sad or being beautiful, but some philosophers hold the view that we do really visually experience (at least some) such properties—that they are part of our sensory phenomenology (e.g., Siegel 2006, 2010). These philosophers endorse a *rich* view about the kind of properties we take to be part of our visual experience. Other philosophers deny that these *seemings*—the way things appear to us in visual perception—have a genuine or merely sensory phenomenology (e.g., Brogaard 2013, 2014; Lyons 2005; Reiland 2015). It may seem to us, the latter argue, as though we could *see* that the tree in front of us is a pine tree, but the distinctive phenomenal character of such a visual experience is determined by a cognitive event that modifies the way in which typical low-level visual properties such as color, shape, motion or texture appear to us. These philosophers hold what is known as an *austere* view about the kind of properties we take to be part of our visual experience.

Here is a sketch of the classic bottom-up picture of visual information-processing that lies behind this philosophical debate. The set of mechanisms sensitive to low-level visual properties and the output states of the processing carried out by those mechanisms is classically known as “early vision.” The areas of the brain that are classically typified as “early vision” are the retina, the lateral geniculate nucleus, the striate cortex (V1) and the extrastriate cortex (areas V1 through V5). At the early vision level, the raw output from the rods and cones of the retina provides grayscale representations. Sharp changes in the intensity of light are then computed as object boundaries. Oriented edges, bars, ends, and blobs are represented in terms of type, position, orientation, scale, and contrast, and are integrated so as to represent the shape, orientation, and depth of the visible surfaces, which are thus separated from the background. At this level, the visual system can also complete, in a viewer-centered

coordinate system, contours that are only partially present in the input image. There is, however, no object recognition and hence no categorization. Categorization does not occur until late vision. Starting at 150–200 milliseconds, “late vision” refers to the joint contribution of many (including non-vision related) mechanisms such as long-term memory and attention, whose signals modulate visual processing so as to bound low-level features into object and property categories not tied to a viewer-centered coordinate system (see Pylyshyn 2003).

Advocates of the austere view take late-vision categorization to consist in a specialized perceptual interface system that produces a particular type of mental event: seemings or perceptual judgments (see, e.g., Lyons 2005: 239–243).² There are different versions of the austere view depending on whether perceptual judgments are taken to have a quasi-cognitive phenomenology, i.e. both a sensory and a cognitive phenomenology or just a cognitive phenomenology. In all of these versions, our seeming to visually experience high-level properties such as being sad or being a pine tree is taken to be nothing but the result of such perceptual judgments. The classic bottom-up picture of visual information-processing thus offers compelling support to the idea of visual categorization, but only through the notion of perceptual judgment.

Advocates of the rich view typically follow a different strategy. They try to show that when it seems to us that something is a pine tree or someone is sad, these seemings are not due to some type of cognitive event, such as a belief or a judgment occurring downstream consciousness. Susanna Siegel, in her classic phenomenal argument (2006, 2010), attempts to do exactly that. To get the argument off the ground, Siegel makes the plausible assumption that there is a phenomenological difference between the overall experiences one is in before and after acquiring certain recognitional capacities, such as the disposition to recognize pine trees—let’s call them O1 and O2 respectively. The argument is then set out in three premises. First, if there is a phenomenological difference between O1 and O2, then the specific visual experiences—E1 and E2—that are parts of O1 and O2 differ in phenomenology. Second, if E1 and E2 differ in phenomenology, then E1 and E2 have different content. Third, if E1 and E2 have different content, the difference consists in the fact that E2 represents the high-level property of being a pine tree. Conclusion: in some visual experiences, some high-level properties are represented.

Siegel’s argument is an argument to the best explanation, as she proceeds by discussing and rejecting a variety of alternative hypotheses for each of the premises. She rejects, in particular, explanations that appeal to changes in the phenomenology of the overall experience—as opposed to the specific sensory phenomenology of the visual experience. At the same time, she appeals to the cognitive penetrability of visual experience to explain this alleged change in visual phenomenology, thus favoring a top-down view of visual information-processing. In particular, Susanna Siegel explicitly endorses this conditional: if we can visually experience high-level properties, then, even if early vision is cognitively impenetrable, in the sense defended by Fodor (1983) and Pylyshyn (1984, 1999) (see below), visual experience is cognitively penetrable by prior cognitive, including affective, states (Siegel 2006, 2010).

Although there are different characterizations of the cognitive penetrability thesis in the philosophical market, rich-view supporters usually portray it as the nomological possibility that two subjects (or the same subject at different times or in different counterfactual circumstances) could have different perceptual experiences as the result of differences in other cognitive (including emotional) background states, while sharing the same proximal stimulus and attending to the same distal stimuli under the same external conditions (cf. Siegel 2010, 2012; Macpherson 2012).³ The cognitive *impenetrability* of perception is the negation of this

claim. The cognitive impenetrability thesis is usually restricted to the domain of early vision, not to perceptual experience (see, e.g., Pylyshyn, 1999; Raftopoulos, 2009). For instance, in the pine-tree training case, we could claim that early visual information-processing is cognitively impenetrable while maintaining, at the same time, that the subject has acquired, through the training, some background cognitive states (a concept, or a set of beliefs), which affect and change her post-training pine-tree perceptual experiences, thus making them cognitively penetrable. Needless to say, the apparent change in content of such post-training experiences could also be explained by appealing to factors other than the cognitive penetrability of perception, as we will see below.

In this chapter, I discuss, from a metatheoretical point of view, the arguments and motivations behind austere and rich views vis-à-vis cognitive penetrability, with a special emphasis on perceptual judgments. I will try to remain neutral with regard to the ultimate plausibility of the views I discuss, even if this may prove to be difficult. I will, however, take issue with those who favor the cognitive penetrability strategy to account for the richness of perception—a view illustrated by Siegel’s conditional above. Rich theorists of this kind seem to think, as Dan Burnston (2017b) so aptly submits, that “anything *categorical*, anything that involves inter-featural (to say nothing of intermodal) *association*, anything that involves *top-down* influence, or *assumptions* about the nature of the world, and anything that is *learned* or involves *memory*, must strictly be due to cognition”. Burnston then adds:

On reflection, however, this is a somewhat odd, or at least non-obvious move. We start out from a presupposition that perception cannot involve X. Then we observe evidence that perception does in fact involve X. In response, instead of modifying our view of perception, we insist that only some *other* faculty, like cognition, must intervene and do for perception that for which it, on its own, lacks.

I couldn’t agree more with Burnston’s diagnosis. Following this diagnosis, the contrasting scenario between rich and austere views can be described as follows. According to rich views, vision does not naturally traffic in high-level properties, so, if we find them there, it must be the result of a cognitive intervention, i.e. it must be the result of the influence of whatever cognitive states are formed when we learn to recognize and discriminate instances of such high-level properties, as in the case of learning to recognize pine trees. Supporters of the austere view, by contrast, allocate some of the functions traditionally assigned to cognition, including categorization, within vision itself since perceptual judgments are the products of an interface system sitting at the divide between perception and cognition: late vision. The debate is open.

The chapter is organized as follows. First, and before discussing these two different strategies in more detail, I flesh out the cognitive penetrability thesis itself. This is important because, as I will try to show, some formulations of the thesis are either too wide-ranging or too weak and thus distort the real philosophical significance of the thesis. The discussion about the cognitive penetrability thesis is also motivated by my attempt to show how there does not seem to be an *exclusively* empirical methodology that adequately distinguishes perception from cognition, a methodology on which the cognitive penetrability thesis relies. Second, I discuss some recent work in social vision, both with regard to the perception of emotion (e.g., Adams and Kveraga 2015) and the perception of animacy (Scholl and Gao 2013) to isolate a set of conditions that the representation of certain high-level, socially salient properties has to meet to be considered genuinely perceptual. I rely on this empirical work to argue in favor of the view that some of our visual representations of high-level properties

have a genuine sensory phenomenology, if the distinction between sensory and cognitive is drawn between experience and judgments. However, as I also argue, third, once the contrasting notion with that of perceptual experience is the notion of *perceptual* judgment, things get muddier, since perceptual judgments, as I mentioned above, are typically considered hybrid episodes with a mixed, perceptual and cognitive, phenomenology. Finally, with this fine-grained notion of perceptual judgment in hand, I tackle the relationship between rich theories and the cognitive penetrability thesis, i.e. the view that, if the content of visual experience is rich, then visual experience is cognitively penetrable. I argue that the very same set of criteria that helps establishing the genuine visual nature of our representations of some high-level properties makes the transition from rich views to the cognitive penetrability thesis problematic.⁴

Cognitive penetrability

Pylyshyn's (1984, 1999) original formulation of the cognitive penetrability of early vision remains a reference point in the contemporary discussion of the cognitive penetrability thesis, even though the cognitive penetrability thesis refers to visual experience and not just early vision information-processing. "If a system is cognitively penetrable" Pylyshyn (1999: 343) contends, "then the function it computes is sensitive, in a semantically coherent way, to the organism's goals and beliefs, that is, it can be altered in a way that bears some logical relation to what the person knows." The cognitive penetrability of early vision requires a direct causal influence of a background state A on the processing of information that leads to penetrated state B. But not any direct causal influence would do. First, such a direct causal influence has to be a causal influence on the processing of incoming perceptual information that is not mediated by attention or by any prior cognitive (including affective) state. Here is an example where the alleged penetrated state is a visual experience. My belief that it is time to turn the oven off, for example, may influence what I see by causing me to move my eyes in the direction of the kitchen clock—a typical case of overt attention. Such an influence, however, is not taken to be direct in the relevant sense, for my belief determines only where I direct my attention, not what I see once I am looking there. To accept that the perceptual input that we end up processing is a result of what we (overtly) attend to would make cognitive penetrability ubiquitous and uninteresting.

A different and more complicated issue is whether other types of cognitively driven attentional effects on perception amount to cognitive penetration. The effects of so-called feature/object-based attention, i.e. the attention we pay to particular features of objects such as their color, is one of these effects. It is a case of what it is known as *endogenous covert* attention, i.e. shifts among locations, features and objects, driven in a top-down fashion, while maintaining one's gaze fixed. For instance, when looking at the *Mona Lisa*, we can, voluntarily and without moving our eyes, focus on different features of the painting: the woman's smile, or her eyes, or the particular hue of her skin. The issue is relevant, specifically, for the cognitive penetrability of early vision, but it has also consequences for the evaluation of cognitive penetrability of experience. Both (e.g., Pylyshyn 1999 and Raftopoulos 2009) disregard this type of attentional effects—considered to be indirect causal influences that occur post-perceptually—as a sign of the cognitive penetrability of early vision-processing. The idea seems to be that, for prior cognitive or affective states to have an influence on early vision-processing, we have first to recognize the object we are looking at. Yet object recognition only takes place in late vision.

It is also central to Pylyshyn's formulation of the cognitive penetrability thesis that the causal relationship between penetrating state A and penetrated state B has to be sensitive to the content of the states involved. Fiona Macpherson's by now classic migraine example illustrates the dangers of omitting this semantic coherence requirement when discussing again experience itself, and not just early vision. My belief that today is the day of an important exam causes me to experience anxiety, which gives me a bad migraine, which, in turn, makes me perceive some flashing lights (Macpherson 2012: 26). Even though my belief eventually causes the light flashes, the content of the belief and the content of the light-flashing experience are not semantically (i.e. logically or rationally) related. There is nothing about the content of the belief that relates to the content of my experience, and it would be a mistake to consider this a case of cognitive penetration.

A formulation of the cognitive penetrability thesis that includes the semantic coherence requirement may be considered too demanding, and there are indeed alternative characterizations in the market that skip this constraint (see, e.g., Stokes 2013). However, there seem to be independent reasons to applaud its inclusion. One of the crucial features of cognitive states, i.e. beliefs, desires, fears, knowledge, etc., is that they are related to each other semantically through complex networks of rational inference. Representations at the cognitive level are governed by standards of rationality that differ from those governing perceptual experiences. Beliefs, for instance, cannot go against our knowledge without thus signaling irrationality, while there is no irrationality, however, in our perceiving what is known to be false.⁵ The existence/absence of semantic coherence between cognitive and perceptual states would thus be a sign of the continuity/discontinuity between perception and cognition—precisely the kind of issue that motivated Pylyshyn's discussion in the first place. A formulation of the cognitive penetrability thesis that incorporates the semantic coherence constraint will make its philosophical consequences much more pressing, if the hypothesis is true, for perception would not depend on cognition just counterfactually, but also rationally.

A contrasting case—a case where the cognitive penetrability thesis seems to be too liberal along this dimension—can be found in the way the general model of perception known as the predictive coding hypothesis (see, e.g., Friston 2010; Hohwy 2013) is sometimes interpreted. According to this hypothesis, higher-level cortical-processing regions in our brain anticipate what the next perceptual input to a lower-level cortical-processing region is going to be. Such predictions, also known as priors, are based on information already in place about the structure of the world and how likely it is, given such a higher-level model of the causal structure of the world, that a certain state of affairs will follow the state we are in. For instance, we are all familiar with the feeling that the mirror we are facing while running on a treadmill moves toward us as soon as we step down from the machine. The reason is that the brain gets used to our movement while running; it predicts that we will keep on doing it and it adjusts how we perceive the forefront so that it feels always at the same distance. But, when we stop, the prediction is disrupted thus generating the brief illusion that the mirror moves toward us. High-level predictions are thus sometimes inaccurate, i.e. the higher-level processing regions of the brain make predictive errors and have therefore to adjust so as to lessen the disagreement between the prediction and the lower-level input. In doing so, however, they encode a very detailed and large amount of information about the source of the perceptual signals that reach the lower-level cortical regions. On this view, the brain is treated as a giant Bayesian engine always trying to predict the next perceptual state based on a constant and coupled flow of information between different hierarchical processing regions and input signals. Perception, or so the slogan goes, is prediction-error minimization.

There is a certain trend in recent literature to move from the idea that perception is prediction-error minimization to the claim that perception is cognitive penetrable (see, e.g., Hohwy 2013; Lupyan 2015). This appropriation of the predictive coding hypothesis seems to equate top-down modulation to cognitive penetrability. Yet one would expect that, to properly talk about cognitive penetrability, the cognitive states whose causal influence is under consideration would have to be distinctive personal-level states—beliefs, desires, and so on—for it is the influence of this type of states that makes cognitive penetrability philosophically interesting. Instead, although there are indeed causal relationships between priors and lower-level states at each level of the hierarchy of information-processing tasks, these priors do not come even close to resemble anything like personal-level states of the relevant kind. Some authors add further constraints to avoid this extreme liberalism. Hohwy (2017), for instance, attempts to resolve this issue by appealing to the idea of hierarchical Bayesian inference. We need to go up in the hierarchy of priors, he claims, looking for those that help regulate the learning rate in such a way so as to optimize perceptual inference. These priors are what Hohwy calls high-level beliefs. However, the notion of high-level belief that Hohwy relies on remains too far removed from the semantically pregnant states that the cognitive penetrability thesis demands. It is a rather deflationist notion of belief—one that fails to capture some of the key features of the full-fledged notion that, at least pre-theoretically, would make the cognitive penetrability thesis a philosophically interesting thesis. Much of what is going on when talking about priors and their effects on perception is really built into low-level, automatic perceptual processes with no access to our explicit knowledge, and what these priors represent is nothing of the sort referred to by the folk-psychological notion of belief or knowledge but rather the very connection strength between different computational elements at each level of visual information-processing.

Finally, even if we accept, like, e.g., Mole (2015) does or some empirical research on attention suggests (e.g., Carrasco 2011) that attention and perception are intimately intertwined—even if we consider that covert attentional effects are part and parcel of perceptual processing itself—two important questions still remain. The first one is whether attention would then be considered part of cognition so as to justify that its effects amount to cognitive penetration (see, e.g., Lupyan 2015). If it is thus considered, the second important question is whether attentional effects would really be, again, effects on the *content* of perception. It could be that attention just affects the salience of certain stimuli whose content is then fixed post-perceptually (see, e.g., Schneider, 2011).⁶ Attentional effects may very well just bias the processing of visual information without having an influence on perceptual experience but rather on perceptual judgments. This is, for instance, Zeimbekis' (2013) interpretation of the classic experiments about color perception of characteristically colored objects run by Delk and Fillenbaum (1965), Hansen et al. (2006), and Olkkonen et al. (2008). In Delk and Fillenbaum's (1965) experiments, for instance, nine figures cut out from the same red-orange material were shown to the participants. Three of them were figures of typically red objects (heart, apple, and lips). Three were geometrical shapes, with no typical color associated to them (oval, circle, and ellipse). Finally, the three other figures were of objects with a characteristic color other than red (horse, bell, and mushroom). The figures were presented in random order. They were placed in the middle of a background surface whose color could be adjusted from red to yellowish-orange. A wax paper was placed over the cutout pieces and the background surface so as to blur the contour of the cutout shape against the background. The participants' task was to match the color of the figure and the color of the background surface so as to make them indistinguishable. The results showed that the figures associated of characteristically red objects were matched with backgrounds significantly redder than any of the other six figures.

The experiments seem to suggest that our color experiences of typically colored objects are cognitively penetrated by our beliefs about these objects—beliefs about their typical color. Yet Zeimbekis (2013) presents these reported effects as cases of selection bias in perceptually difficult tasks, i.e. in tasks that demand extremely fine hue discrimination. Attending to figures of typically colored objects, he claims, biases the processing of color information, especially in conditions of uncertainty. In such conditions, deployment of the concepts of such objects affects our perception of their color through anchoring the relevant color concepts in subjects' perceptual judgments. Selection bias is thus taken to be consistent with the cognitive *impenetrability* of perception.

The present discussion makes it clear that, even though the cognitive penetrability thesis is an empirical thesis, its formulation is a rather intricate philosophical task. We have also seen that whether it is justified to claim that a mental state or a process is cognitive penetrable or not is deeply intertwined with the very same issues that drive the debate between rich and austere views: how to demarcate the boundary between cognition and perception. The connection between the cognitive penetrability thesis and these views will be discussed in the last section.

Vision science

The difficulty of agreeing on a standard formulation of the cognitive penetrability thesis is clearly bad news for rich theorists. But do other areas of vision science offer a clearer path toward settling the debate between rich and austere views? In this section, I discuss some empirical results that initially seem to give an answer to this question. I will try to show that recent research in social vision offers enough evidence to grant that *our brain* has evolved to quickly detect certain evolutionarily and developmentally relevant high-level properties, such as anger or animacy, thus seemingly supporting a rich view of the content of perceptual experiences involving such properties. The presence of specialized perceptual mechanisms makes the visual experience of these properties a fast, automatic, unintentional and highly stimulus-driven event. I would like to call the conjunction of these features when applied to the processes that yield our visual experience “the irresistibility of the stimulus criterion.” If the irresistibility of the stimulus criterion is met, then the claim that the phenomenology of these experiences is genuinely sensory will be justified, especially when contrasting sensory phenomenology with the phenomenology (if any) of judgments or beliefs—as paradigmatic cognitive events. But things get much blurrier when we look at these results with a more sophisticated theoretical toolbox—one that includes not just the full-fledged notion of judgment, i.e. the notion of all-things-considered judgment, but also the notion of perceptual judgment. I will discuss this latter point in the next section. Let me, first, briefly present some of this research.

Recent developments in the field of social vision seem to support the idea that we are both sensitive and capable of perceiving high-level properties such as tenderness, anger, fear, gender or, even more abstractly, general intentionality. A leading hypothesis in the field is that our visual system has evolved in such a way so as to quickly interpret the social visual cues that convey information about our fellow humans' emotions and intentions. This fast visual interpretation of social cues makes adaptive sense, it is argued, because it allows us to anticipate other people's most likely behavior.

Adams and collaborators (e.g., Adams and Kveraga 2015) have isolated certain areas of the brain that seem to be sensitive to the presence of, for instance, threat cues on the faces of others. They have shown that their activation is linked to the activation of typically emotion-related areas, such as the amygdala. When considering pre-attentive responses to emotion

expressions on members of a different racial group, some studies show that, e.g., white and black participants exhibit a negative affect when they are subliminally exposed to the joy of the members of the other racial group (Weisbuch and Ambady 2008). Negative emotional responses to emotion expressions have also been observed in black and white subjects when they are subliminally exposed to expressions of joy on the other race's members' face. These findings, due to their very nature, i.e. due to the fact that the subjects are *subliminally* exposed to the stimuli (they are not aware of them), indicate that our brain is able to detect and process emotional social properties quickly and efficiently. That we are thus sensitive has a clear evolutionary explanation, as the detection of socially relevant emotional properties prepares us to anticipate, for instance, forthcoming physical danger in our environment. However, it would be a mistake to talk here about visually experiencing these high-level properties, because there is no conscious awareness and hence no experience.

Other experiments, which involve conscious attention, appear to be more relevant for settling the issue of visually experiencing high-level properties—and not just being sensitive to them. The influence of the expression of emotion in gender recognition is one of the better-known studies in this regard. Hess et al. (2009) suggest, for instance, that subjects are more likely to perceive androgynous faces with angry expressions as male. Androgynous faces exhibiting joy or fear are, by contrast, more likely to be perceived as female. In a different study, subjects are shown a combination of male and female faces expressing emotions such as joy, sadness or anger but also displaying neutral, emotion-free expressions. The task is, again, gender recognition. In this set-up, Hess and collaborators measured the time it takes subjects to identify males and females. What they found is that female faces expressing anger take the longest to be identified (Hess et al. 2009). Adams and collaborators (Adams and Kveraga 2015) rely on this type of studies to support the idea that we visually experience socially relevant properties such as gender and emotion. If they are right, our visual *experience* of emotions will be precisely what helps the gender categorization task—or what disrupts it, as the second study shows—thus seemingly giving empirical support to the rich view.

We should not forget, however, that the subjects in these experiments, like in any experiment involving category identification, respond to the stimuli only after *having paid attention* to the relevant properties, i.e. after consciously and cognitively engaging with the task at hand. It thus becomes rather difficult to assess whether they really visually experience high-level properties, such as anger, as opposed to *judging* them to be there. Adams and his collaborators take the fact that both subliminally driven and attention-involving responses in these experimental situations are automatic, effortless, and unintentional routes as the crucial factor for distinguishing between visual experience and something cognitive, like a judgment. It is important to keep in mind, however, that these criteria would be decisive only if the boundary between visual experience and cognition were drawn along full-fledged judgments—i.e. conscious events deliberately formed based on evidence or as a result of reasoning. But no one thinks of *perceptual* judgments in these terms, as I will clarify below. Meeting just these conditions thus falls short of drawing a principled divide between experience and cognition. The relevance of these results for settling the rich vs. austere debate should thus be taken with a pinch of salt since the empirical work itself lacks an *experimentum crucis* for categorizing perceptual experience vs. cognition in the first place.

Things get slightly better when looking at a different strand of research in vision science: Brian Scholl and his collaborators' recent work on the visual representation of animacy, or as they also call it, intentionality (see, e.g., Scholl and Tremoulet 2000; Scholl and Gao 2013). It is important to notice that the motivation behind this research is precisely to support the idea that, in talking about the perception of animacy, we are not just speaking loosely or metaphorically. Their experiments are designed to test for the truly perceptual nature of our experiences of animacy. The hypothesis they set up to prove is that:

[V]ision itself may traffic in animacy as well as physical features such as shape and orientation. This is an exciting possibility, suggesting (as with other forms of social perception) that the purpose of vision is (in part) not only to recover the physical structure of the local environment, but also to recover its causal and social structure.

(Scholl and Gao 2013: 202)

The experiments are set up in such a way so as to also make sure that lower-level visual properties cannot be invoked in the explanation of the results.⁷ These studies involve subjects having to complete a task while watching simple geometric shapes moving around very rapidly on a computer display. There is a chasing shape, referred to as the wolf, which pursues another shape: the “sheep”. The sheep is the only figure that is salient and can be controlled by the subjects. The task is to move the sheep around to avoid being touched by the wolf. This could be done because the sheep moves faster than the wolf. The details get somewhat technical, and they vary in different studies (see, e.g., Gao et al. 2009), but the key point is that the only way to detect the wolf is by its spatiotemporal behavior, since the shape of the wolf is identical to other shapes on the display. Only the sheep is clearly different. In this way, the task is truly a chasing detection task, as there is no other feature through which the wolf could be identified. Chasing detection is taken to be a form of *perceived* animacy. In each trial, either the subject-controlled sheep escapes from the wolf after a certain time, i.e. it moves away in a random direction as soon as the wolf gets close to it, or is caught—touched—by the wolf. The overall visuomotor performance is measured in terms of the percentage of successful escapes. Crucially, Scholl and Gao claim: “this ability to detect chasing could not be explained by appeal to any lower-level form of perception such as correlated motion or proximity” (2013: 211).⁸

In a different set of studies, Gao and Scholl (2011) examine explicitly the possible influence of cognition on the perception of animacy by randomly interrupting the wolf’s chasing behavior and alternating it with periods of random movement. The task remains the same: to avoid the wolf. In each trial, the relative percentage of chasing and random motion varied from 0 to 100 percent. When measuring performance, they found that both small and large percentages of random motion led to comparatively successful performance (although for different reasons: in the former case, the wolf was easier to detect and avoid. In the latter case, the wolf’s chasing behavior was simply less efficient). At the same time, when the percentage of random motion stayed in the middle range, i.e. when the wolf was still relatively easy to detect, the performance was dramatically compromised.⁹ What these results show, according to Scholl and Gao, is that the perceived animacy cannot be due to a conscious *cognitive* event, simply because subjects not only do not know but also because they cannot even tell the difference between small and medium percentages of random motion—the difference between, e.g., 20 and 40 percent. Hence, it does not make sense to think that the subjects’ performance is the result of a judgment about animacy because in order to assume that, we would have to think that the subjects have information that is not even consciously available to them (Scholl and Gao 2013: 213). Here is a way of thinking about these experiments. Optic illusions such as the Müller–Lyer illusion are typically considered good illustrations of the cognitive *impenetrability* of perception, i.e. cases in which perception is truly isolated from cognition because we perceive that *p* (e.g., that the two lines in the Müller–Lyer illusion are different in length) while knowing that not *p* (knowing that the two lines are of exactly the same length). What Scholl and Gao’s experiments show equally seems to reinforce the cognitive impenetrability of the perception of animacy since we perceive that *p* (e.g., that a geometric figure “intends” to do something, i.e. exhibits animacy) even though

we do not know whether *p* or *not p* (we have no knowledge and no background information about the relevant parameters of random motion involved in the displays). Scholl and Gao (2013: 214) conclude:

The point of reviewing these studies here is to note that chasing detection (as a form of perceived animacy) is influenced in systematic ways by rather subtle display parameters, in the form of a psychophysical function (and in ways that do not seem readily explainable by appeal to higher-level judgment) ... [These studies] ... also support a social vision interpretation of perceived chasing in an even more direct way. Beyond the compelling phenomenology of the displays themselves, the data reported in these studies are all measures of visuomotor *performance* rather than explicit reports or ratings. This is an important distinction since overt decisions about what should and should not count as animacy can directly influence reports and ratings ... but have no way to directly influence visual performance of the type studied here.

These results show that the phenomenology of experiences of animacy cannot be explained in terms of the phenomenology of some other low-level properties. They also help reinforce the relevance of what I earlier called “the irresistibility of the stimulus criterion” as a good litmus test for dissociating perception from cognition with regard to certain visually perceived properties such as animacy. Or so it seems. They do so only by showing that perceived animacy is not the result of a judgment—a conscious event understood along the lines of all-things-considered judgments. But are judgments the most relevant cognitive event to use as contrasting notion when assessing the type of phenomenology involved in visual experience? I turn to this issue in the next section.

(All-things-considered) judgments vs. perceptual judgments

The empirical results just discussed seem to suggest that visual processing of information can be categorical, i.e. that it can yield states of, e.g., perceived anger, perceived gender or perceived animacy. But taking these categorizations as genuinely visual is warranted only inasmuch as (1) their being so perceived meets the irresistibility of the stimulus criterion, i.e. only inasmuch as their being so perceived is the direct result of the operative of some properly visual mechanism whose outcomes are automatic, effortless, unintentional and stimulus-driven; and (2) the contrasting cognitive event that allows us to draw the distinction between perception and cognition is that of an all-things-considered judgment—a typically personal-level cognitive event. Paradigmatically, (all-things-considered) judgments are conscious events deliberately formed based on evidence or as a result of reasoning. Judging is typically characterized as the mental interiorization of assertion (Dummett 1981: 363). Judging is a type of mental action that consists in endorsing the truth of a proposition. To judge that *p* is something *we* do. This is the sense in which judgments are personal-level cognitive events. Yet, when thinking about *perceptual* judgments, none of these properties apply. Perceptual judgments lack almost all the paradigmatic characteristics of full-fledged, all-things-considered judgments. When we look at a red tomato while walking down the aisle at the supermarket and it seems to us that there is a red tomato in front of us, this perceptual judgment is not the result of having engaged in an evidence-based reasoning process involving acknowledging the truth of our perceptual state. Perceptual judgments occur without us realizing it. They are not something the subject does but something certain subpersonal perceptual mechanisms do. There is no agency involved, no voluntary mental act performed by the subject, nothing like a subject’s endorsing the truth of a proposition. They are effortless, automatic, unintentional and stimulus-driven—just like perceptual experiences.

Perceptual judgments are here taken to be what in the literature is known as phenomenal (as opposed to epistemic) “seemings” (Brogaard 2013, 2014; Lyons 2005; Reiland 2014, 2015; Tucker 2010). Brogaard (2015) characterizes epistemic seemings as cognitive states about what a subject takes to be subjectively probable based on her evidence. Epistemic seemings are illustrated by sentences like “Peter seems sincere.” If the subject is rational, her epistemic seemings will go away in the presence of a defeater. But this is not the case with phenomenal seemings—i.e. with perceptual judgments. Things may (perceptually) seem to us to be *F* even against our background knowledge that they are not. We cannot suspend, modify or abandon our perceptual judgments—such weighing of evidence and reasons comes out only at the level of full-fledged or all-things-considered judgments. Perceptual judgments are, in the sense characterized above, irresistible. Like perceptual experiences, and unlike full-fledged judgments, perceptual judgments belong outside the realm of rationality. There is nothing irrational in our seeming that something is an *F* even when we know that is not. There is indeed nothing irrational in our perceptually judging that the two lines of the Müller-Lyer illusion are different in length despite our full-fledged judging, based on our background knowledge, that there are exactly the same.

To draw the contrast between perceptual experience and perceptual judgment, we need to think about perceptual experience as having, on the one hand, only sensory phenomenology, i.e. the kind of phenomenology that could be shared by creatures with and *without* the relevant concepts of LENGTH, LINE, SAME or DIFFERENT. We need to think about perceptual judgments, on the other hand, as the contribution that certain subpersonal mechanisms make to the *overall* perceptual state via the categorization of such sensory component—a contribution that only takes place in creatures who possess the relevant concepts. If we have the concepts corresponding to the properties instantiated by the objects we perceive, the phenomenology of the overall experience could not be other than a combination of sensory and cognitive phenomenology. That’s why anyone who has the concepts of LENGTH, LINE, SAME, and DIFFERENT, cannot help but perceptually judge that the lines in the Müller-Lyer illusion are different in length, even if, e.g., a prelinguistic infant may have the same experience without being able to perceptually judge anything. This is, at least, the standard view—once we introduce the notion of perceptual judgment into our account of how we represent the world in perception. As I said in the introduction, and as it should be clear from these remarks, perceptual judgments are typically characterized as hybrid mental episodes, with a perceptual and a cognitive component. Raftopoulos (2011), for instance, characterizes perceptual judgments as hybrid visual/conceptual constructs. Those who advocate the very notion of seeming and vindicate their role in the justificatory role that experience plays vis-à-vis belief also endorse the view that seemings have a hybrid phenomenology. The rationale is the following: things can seem to us to be *F* in a perceptual judgment only if *F* is part of our conceptual repertoire, so the phenomenology of perceptual judgments cannot be just sensory or perceptual. Perceptual judgments are instead considered the products of interface systems between perception and cognition, sharing phenomenological aspects of both. If we were to use representationalist talk, we would say that their content is conceptual. At the same time, things may seem to us to be *F* in a perceptual judgment only if there is a perceptual experience of something with a particular sensory/perceptual phenomenology—the phenomenology of a characteristic *F* look—that is fed forward into the dedicated perceptual mechanism that produces the seeming. Phenomenal seemings are thus typically taken to be caused by perceptual experiences but different from them. Here is a gloss on the distinction that I find particularly helpful (Reiland 2015: 512):

Experiences are non-conceptual and by themselves *blind*: they don't tell us anything in terms of the categories we think in. Seemings are conceptual but by themselves *empty*: they don't even putatively present it with any truth-makers for what they tell us. In contrast, the right sorts of composites are both *sighted* in telling us something in terms of our categories and *full* in putatively presenting us with something that we can point to as a truth-maker for what we're being told.

We need to tread carefully when it comes to the idea of perceptual judgments as conceptual, as opposed to perceptual experiences as *blind*. This does not mean that perceptual experiences have no phenomenology of their own. It means that what we visually experience (without the intervention of a perceptual judgment) is always a particular—a particular object and the instantiation of a particular property—not a category (see, e.g., Schellenberg 2010). We experience the particular greenness of the particular pine tree in front of us and not just generic green or generic pinetreehood. On this account, (mere) sensations are distinguished from perceptual experiences, and both are distinguished from accompanying seemings. (Mere) sensations are experiences with no objects, such as the experience of seeing a patch of blue that occupies the whole of your visual field. Perceptual experiences, by contrast, involve objectification and require perceptual constancy. Roughly, a sensory system exhibits perceptual constancy with respect to some property *F* (e.g., size, shape or color) just in case it produces representations of *F* that remain stable as long as *F* remains stable, even if the corresponding proximal stimuli vary considerably. For instance, when we visually experience a pine tree, we see it as having the same size both in the distance and when we get closer to it, even though its retinal image varies according to how far we are from it. We also get all the characteristic looks of the tree, e.g., the distinctive shade of green or the intricate shape of its leaves, for which we may or may not have the corresponding concept. But the pine tree would only seem to us to be a pine tree, if we also have the relevant concept, perceptually paired to those characteristic looks. It is the accompanying perceptual judgment, with its quasi-cognitive phenomenology, that accounts for our overall experience of seeing a pine tree. The novice's and the expert's visual experience, when looking at a pine tree, is exactly the same. But only the expert, to whom we grant the recognitional capacity brought out by the dedicated perceptual system that produces the relevant seemings, has an overall experience as of a pine tree. Also, and importantly, such dedicated perceptual systems can only pair concepts to objects with characteristic looks. There is no perceptual judgment involving, for instance, the property of being beautiful. Perceptual judgments thus sit at the divide between perception and central cognition, processing information that comes in an analog and fine-grained format (the information provided by the experience) and turning it into a digital, coarse-grained and conceptual, but still perceptually based, format (see, e.g., Burge 2010: Chapter 11; Brogaard 2013, 2014; Reiland 2015).

We need not buy the distinction between sensations and perceptual experiences to appreciate how this picture can help us settle the issue of whether we can visually experience (some) high-level properties. I only mention it because, on the account just rehearsed, the term “sensory” is reserved for the phenomenology of sensations (since sensory phenomenology and perceptual phenomenology are distinguished) whereas I have been using “sensory” in a sense that covers both. We can ignore the subtleties of this distinction for the present purposes. What really matters here is that the property of being a pine tree (or being sad or being animate) is not part of the phenomenology of the visual experience but of the phenomenology of the overall experience—i.e. the visual experience (proper) plus the perceptual judgment which accompanies it—and hence it is not pure sensory (in my original sense) or

perceptual phenomenology. It is also important to acknowledge that there could only be perceptual judgments about individuals and kinds with typical looks. For the dedicated mechanisms that generate perceptual judgments require distinctive perceptual profiles so as to be able to encode the pairings with the relevant categories (see, e.g., Burge 2010: Chapter 11; Lyons 2007).

I have shown that once perceptual judgments are part of the toolbox for examining the plausibility of rich versus austere views, things get messy. Not even the promising criteria distilled from our discussion of empirical results in the relevant areas of research help to settle the issue. For both visual experiences and perceptual judgments are fast, automatic, unintentional and resiliently stimulus-driven events—both visual experiences and perceptual judgments are “irresistible” in our terminology. Both types of events also sit outside the sphere of the rational connections that characterize cognition. But one thing is clear. Even if there is no visual categorization of (some) high-level properties without concepts and hence without adding the quasi-cognitive phenomenology of perceptual judgments to the sensory phenomenology of experience, it is extremely implausible that such visual categorization is the result of cognitive penetrability. *A fortiori*, it is even more implausible to think that, if visual categorization of (some) high-level properties is a truly sensory phenomenological affair, then the cognitive penetrability thesis holds—contrary to what advocates of the rich view typically defend (see, e.g., Macpherson 2012; Siegel 2012). I will argue for this claim in the next and final section of this chapter.

Experience, perceptual judgments, and cognitive penetration

As we have seen, in order to mark off perception (either in the form of experience or perceptual judgments) from cognition, some important conditions have to be met: the relevant response pathways have to be automatic, effortless, unintentional, and perceptually irresistible. The outcomes of these response pathways also need to exhibit isolation from the rational network of background beliefs and knowledge that constitute our cognitive economy. Let’s call this set of conditions the set *V* (for vision).

It requires only a moment’s reflection, however, to appreciate that the satisfaction of *V*, especially the satisfaction of what I have called the irresistibility of the stimulus criterion (p. 000) and the rational isolation, clashes with the very idea of there being a causal and semantic influence of background states on visual experience—it clashes with the idea of visual experience being cognitively penetrable. That our experiences of high-level properties have a genuine sensory phenomenology seems to be best vindicated—perhaps could only be vindicated—if we assume that visual experience is impenetrable in the sense captured by (the negation of) the cognitive penetrability thesis.¹⁰ For this type of impenetrability or modularity guarantees not only irresistibility, it also explains rational isolation.

This appeal to modular perceptual processing as guarantee of genuine rich visual content is bound to strike some as implausible because modularity is usually wedded to innateness and hence the prospects for a successful explanation of development and learning may seem dim. I would like to make two points about this. First, the idea that standard evolutionary constraints account for the development of specialized, hardwired perceptual mechanisms is widely accepted among vision scientists, as it fits perfectly with all the properties in *V* (see, e.g., Michotte 1963).¹¹ The only downside to making hardwired perceptual mechanisms responsible for genuinely rich visual content is that there may very well be fewer high-level properties that we are thus able to visually experience than those typically vindicated by rich theorists. Second, contrary to one of the tenets of the traditional modularity thesis (see, e.g., Fodor 1983),

modules need not be innately specified. There is plenty of neuroscientific evidence that suggests, as it seems plausible, that for many of these computational modules, environmental triggers are necessary, with some developing “from ‘scratch’ over time, based on experience” (Scholl and Tremoulet 2000: 306). Modularity places restrictions on the flow of information into and from the modules. Yet there are no restrictions on how the information is treated within the module: low-level sensory plasticity and constant adjustment and reorganization of neural connectivity within modules is standard. This view allows for boundary crossing of perceptual features without renouncing to the notions of modularity or impenetrability. On this view, the functional boundaries of modules are drawn after discovering such feature interactions, which often occur across different modalities (Burnston and Cohen 2015).

Let me finally add a brief note about the relationship between visual categorization and recognitional abilities vis-à-vis cognitive penetrability. Take Siegel’s classic phenomenal contrast argument in favor of the rich view. As I said in the introduction, the argument assumes that the recognitional ability we gain after training, after, e.g., acquiring the concept of pine tree, explains that we are then able to visually experience pine trees. The appeal to cognitive penetrability is the strategy to get visual categorization where there was none to begin with. Yet, this appeal to cognitive penetrability jeopardizes the genuine sensory phenomenology of experience—the very feature that the phenomenal contrast argument set up to prove. The explanatory direction between seemings and recognitional abilities for the advocates of the austere view is the opposite one. They hold that seemings explain recognitional abilities, because having the recognitional ability is nothing more than having the relevant dedicated perceptual system working in the way it should: pairing typical looks with conceptual categories through learning. Austere views need not appeal to cognitive penetrability because the concepts are already in place—only those referring to objects and kinds with characteristic looks—and because it would not make any sense given the explanatory role of perceptual judgments vis-à-vis recognitional abilities. Recognitional abilities, as part and parcel of the concepts that allegedly would have to cognitively penetrate perceptual judgments if the cognitive penetrability thesis were to hold, are explained by perceptual judgments—not the other way around. Hence they are explanatorily downstream from them (see, e.g., Reiland 2015). If this is true, then we get visual categorization through concepts but without cognitive penetrability. An anomaly? Perhaps, but a highly plausible one.

Notes

- 1 I will use the terms “sensory” and “perceptual” interchangeably throughout the chapter. Below, I draw a distinction between the two just to clarify a particular view, but the distinction is not, in general, important for my purposes. Although I focus here on vision, the same issue could be raised for each of the sense modalities.
- 2 I use the two terms interchangeably throughout the text.
- 3 See, e.g., Stokes (2013, 2015) and Machery (2015) for a good discussion and for different accounts of the cognitive penetrability thesis.
- 4 A similar thesis is defended in Brogaard and Chomanski (2015) through a slightly different argument.
- 5 Or in our seeming to perceive. Perceptual judgments are also isolated from the realm of rationality (see below).
- 6 Gross (2017) offers good reasons to answer both questions in the negative.
- 7 Lower-level properties such as motion trajectories, rotational motion or degrees of correlation between the chasing and target shapes.
- 8 For an online demonstration of one of the already performed trials, see <http://perception.research.yale.edu/Animacy-Wolfpack/Animacy-Wolfpack-Game-Pointing-NoCheating.mov>. See also Gao and Scholl 2011.

- 9 For online demonstrations of all studies on interrupting chasing, see <http://perception.yale.edu/Brian/demos/Animacy-ChasingTemporal.html>.
- 10 Even if there is some other type of top-down causal influences of cognition on perception. See Burnston (2017a) for an alternative view to the cognitive penetrability thesis, what he calls the *external effect view*. On this view, tokening of a concept as part of a cognitive state provides just a bias that increases the probability of one perceptual outcome to be selected among a range of independently available ones without determining its content.
- 11 This explanation is particularly appealing when considering evidence from social vision. In places, Adams and collaborators seem to follow this route.

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17

PERCEIVING SURFACES (AND WHAT THEY DEPICT)

Gabriele Ferretti

Pictures are puzzling artifacts, and so is our perception of them. Understanding what we really see when looking at an object in a picture, as well as what the differences are between perceiving an object in a picture and perceiving a real object, is one of the most interesting enterprises in the current philosophy of vision.

Some have suggested that the perception of objects in a picture and the perception of real objects are similar in some respect (Nanay 2011, 2017; Lopes 1996, 2005; Hecht et al. 2003; Briscoe 2016, 2018; Ferretti 2017a). On seeing a flower in a picture, it is the flower that becomes the content of our visual experience (Nanay 2017; Chasid 2014). It's no mere chance that we can attribute several similar properties, i.e. colors, shapes, geometrical arrangements, etc., to both objects in a picture and to real objects (Nanay 2010a, 2011, 2015, 2017; Ferretti 2016a, 2016b, 2017a, 2017b; Brooks 2017; Hecht et al. 2003; Briscoe 2016, 2018).

Notwithstanding all the possible similarities we can find between these two perceptual phenomena, there seems to be, undoubtedly, a crucial difference between seeing a flower in a picture and seeing it face to face: only the latter offers our visual experience the visual feeling of presence (Matthen 2005; Ferretti 2016c, 2017b; Nanay 2015; Briscoe 2016). However, it has been suggested that depicted objects are in fact present in the realm of pictures (Aasen 2015). They are not *there* as real objects *are* for us (Pettersson 2011). Rather, they display a sort of presence in absence (Noë 2012). Indeed, it is incontrovertible to say that objects in a picture are not able to display all the visuospatial and visuomotor cues of a real scene: we do not visually represent, when facing a depicted apple, the same spatial and motor relations we can entertain with a real apple (Nanay 2010a, 2011, 2015; Hecht et al. 2003; Vishwanath 2014; Hopkins 2012; Briscoe 2016, 2018; Ferretti 2016a, 2016c, 2017c; Matthen 2005; Gerhard et al. 2016). Following the usual jargon adopted in philosophy of perception, when the content of our experience is pictorial, we cannot attribute to it particular spatial and motor properties (Siegel 2010). (In what follows, the reader can substitute the expression “we consciously visually represent or see x” with “x is the content of our visual experience.”) Pictures are, then, particular objects of perception (Gregory 2012; Ferretti 2017c; Chasid 2014; Aasen 2015).

We can, of course, see the flower in a picture by means of visually attributing particular visual properties to the surface it is visually encoded in (Nanay 2017), which is, indeed, a real and present object: we see the flower in virtue of seeing the marks made across the surface

that can generate in us the experience of the flower by being grouped by our visual system into a flowery arrangement (Voltolini 2013). Thus, unlike being in front of a real flower, being in front of a depicted flower also entails being in front of the surface this depiction is visually encoded in. The way the marks on the surface are arranged determines if and how we see the pictorial content.

At this point, it may seem intuitive to say that we also see the surface when looking at a depicted object. However, the reader should note that this ontological dependence of what is depicted on where it is depicted (or visually encoded in) (the way the latter is realized determines the way the former is arranged, grouped and perceived) does not entail a perceptual dependence (Nanay 2017: §4): the fact that we see the flower because we are in front of a surface whose properties can be grouped so as to perceive a flower does not imply that we also perceive the surface itself as such. As Lopes states: “It is only in virtue of seeing the configuration of marks on its surface [...] that we see anything at all in the picture. However, seeing a pictorial design face to face does not entail seeing the design as a design” (2005: 28). When discussing the notion of the representation of the surface, Nanay affirms, “This is not a trivial claim: just because the picture surface is right in front of us, this does not mean that it is perceptually represented. An alternative would be to say that we only represent the depicted scene perceptually—the picture surface is not perceived at all” (2017: footnote 5; see also 2016: 41).

All this suggests that we need a specific argument in order to defend the claim that, when perceiving a depicted apple, we also perceive the surface (we, of course, are in front of) the apple is visually encoded in.

For example, it has been suggested that, in some cases of pictorial illusions, like *trompe l’oeil* pictures, although we effectively are in front of a picture, we have problems with the perception of the surface. Some suggest that we do not see any surface (Ferretti 2018b). At the same time, we experience the depicted object as if it were a real and present one (Nanay 2015; Lopes 2005; Ferretti 2016c, 2017b, 2018a, 2018b).

Whether or not we consider *trompe l’oeil* experience as pictorial experience, *trompe l’oeils* are still pictures, albeit of a special kind (Wollheim 1987; Nanay 2015; Lopes 2005). Thus, it is already clear that there is a specific relationship between visual and pictorial presence on the one hand and the way our visual representations of different but related aspects of a picture work on the other.

The reader may understand now that, when considering these important perceptual facts, we need to establish, with regards usual picture perception, which components of a picture we effectively perceive when we are in front of it. In this paper, I want to suggest an argument able to show that we always perceive the surface in ordinary (non-illusory) picture perception. Before doing so, I need to describe the status of the literature so as to explain why my point is important and how it is new with respect to what has been proposed so far.

The options in play

The debate about the differences between seeing objects in a picture and seeing real objects is still open. Understanding this difference means to understand what are the peculiar constraints governing the functioning of our visual system in order to enter the peculiar visual state we are in during picture perception. As recently noted by Nanay (2017), here are the options we have at our disposal when investigating which components of a picture we effectively perceive when we are in front of it:

- 1 We only see the surface, not the depicted object.
- 2 We only see the depicted object, not the surface.
- 3 We see both the surface and the depicted object.

The literature on picture perception seems to agree that (3) is the best explanation of what happens during picture perception. Option 1 is ruled out because, provided that we indeed represent in some way the depicted object (this being at the basis of picture perception), it has been suggested that the way we represent it is perceptual: we visually represent it (Nanay 2012, 2017; Hopkins 2012; Lopes 1996, 2005; Kulvicki 2006, 2014; Ferretti 2016a, 2016c, 2017a, 2017b). Thus, we see it. It is unlikely, then, that we do not see the depicted object.

Option 2 is ruled out because perceiving the surface seems to be an important aspect of picture perception that is supported by several reasons: for example, the way we visually represent the surface modulates how we visually represent the depicted object (Nanay 2011, 2017; Voltolini 2013; Lopes 2005; Briscoe 2016, 2018; Ferretti 2016c, 2017a, 2017b, 2018a, 2018b).

In this respect, evidence that Option 3 *might be the case* is that *it might happen that the way in which we perceive the depicted object strictly depends on the fact that we perceive the surface* (Nanay 2011: 473; 2017: 5.1; Ferretti 2017b). Here is an example recently discussed by Nanay. The size of an object in a picture and the (same) size of the very same object presented behind a Plexiglas can appear different. This difference is arguably given by the perception of the surface in the case of the first object (Nanay 2017: 5.1; for other cases, see Nanay 2011: 473). Evidence that Option 3 *needs, indeed, to be the case*, and this is a stronger argument with respect to the former, is that *a particular aspect of picture perception that is responsible for the way we always perceive the depicted object strictly depends on the fact that we perceive the surface*. Here is an example. A peculiar aspect that *always* accompanies normal picture perception is that if we move with respect to the picture we do not perceive any spatial shift with respect to the depicted object, but only with respect to the surface.¹ Depicted objects exhibit shape constancy. However, note that “the retinal image specifies a different scene, but we normally do not notice the changes” (Vishwanath et al. 2005: 1401). It has been suggested that the explanation for this perceptual phenomenon might be that we visually represent the surface and this leads to a compensation of the oblique view (for a critical review see Wollheim 1980; Kulvicki 2006; Nanay 2010b, 2011, 2017; Briscoe 2018; Hopkins 2012; Vishwanath et al. 2005). If we never perceive spatial changes with the depicted object and if this perceptual phenomenon seems to depend on the perception of the surface, then Option 3 is the best candidate to capture what happens in picture perception: we see both the surface and the depicted object. Furthermore, for the reasons above offered, when endorsing Option 3, philosophers also suggested that we see both the surface and the depicted object *simultaneously* (for a review see Nanay 2017) – another option might be that we alternate between these two visual states (I do not discuss this further bifurcation of options here, see Nanay 2017, Ferretti 2018a).

At this point, the reader should note, and this is crucial for the point of this paper, that endorsing Option 3 has led the literature to further bifurcations of the debate, for when endorsing Option 3, we need to address a further specification – indeed, several philosophers have discussed and endorsed Option 3 with several variants (Nanay 2010a, 2011, 2017; Lopes 2005; Briscoe 2018; Hopkins 2012; Kulvicki 2006, 2009; Ferretti 2017b, 2018a, 2018b; Voltolini 2013, 2015; Chasid 2014; Levinson 1998; Feagin 1998). First of all, vision can be conscious or unconscious (Milner and Goodale 2006; Farah 2004; Prinz 2010). So, when endorsing Option 3, we need to specify what we mean by “vision,” i.e. we need to specify whether we are talking about *conscious* or *unconscious* vision. When doing so, we discover that we can further split our claim:

- (3 α) We consciously see both the surface and the depicted object simultaneously.
(3 β) We simultaneously see both the surface and the depicted object, but we do not consciously see both of them simultaneously.

For Option 3 α , at a given time we consciously see both the picture's surface and the depicted object simultaneously. For Option 3 β , either we consciously see the picture's surface, while unconsciously seeing the depicted object, or we consciously see the depicted object, while unconsciously seeing the picture's surface. But it is not the case that we consciously see both of them at the same time. At this point, it is worth specifying that there are two options lurking behind Option 3 β :

- (3 β i) We consciously see the surface, while unconsciously seeing the depicted object.
(3 β ii) We consciously see the depicted object, while unconsciously seeing the surface.

But things are not so easy. We can immediately see how Options 3 α and 3 β demand us to choose between the following options:

- (3a) It is required that we consciously see both the surface and the depicted object simultaneously in ordinary everyday visual experience of pictures.
(3b) It is *not* required that we consciously see both the surface and the depicted object simultaneously in ordinary everyday visual experience of pictures, *but we sometimes can* (arguably in special cases).²
(3c) It is not required that we consciously see both the surface and the depicted object simultaneously simply because we cannot.

Now, the reader should know that most of the current debate is fueled by the question about which option we should go for, between these three, when explaining the nature of usual (non-illusory) picture perception³.

Some have endorsed Option 3a for several reasons (for a critical review see Hopkins 2012: 650; Kulvicki 2006, 2009; Newall 2009, 2011; Voltolini 2013, 2015; Nanay 2005, 2010a, 2011, 2017; Cavedon-Taylor 2011). However, this view has been recently challenged (see below) (Hopkins 2012; Nanay 2011, 2017). Others have chosen to endorse Option 3b by offering arguments that simultaneous consciousness is possible, but not necessary in order to enter pictorial experience (Nanay 2010a, 2011). The first reason is very simple and intuitive in the light of our common visual experience of ordinary picture perception: most of the time, during our perception of pictures, it seems phenomenologically evident that we patently ignore, in terms of visual consciousness, the picture's surface (Levinson 1998; Lopes 1996; for an analysis of this point see Nanay 2011: 463). Thus, though it is true that we indeed see the picture's surface when we see something visually encoded in it (in the general sense of "seeing" and "simultaneity," i.e. Option 3), it is not necessary that we consciously see its design as a design (Lopes 2005; Nanay 2011: 464; §1). Second, empirical evidence clearly suggests that picture perception is possible even if we are not conscious of either the surface or the depicted object (for a review see Nanay 2011: 463 n. 1; 2017: §2), i.e. entailing that either Option 3 β i or 3 β ii could be the case. If we needed to consciously see both the surface and the depicted object simultaneously, this would go against this empirical evidence. Of course, this suggests that we can perceive objects in a picture unconsciously. In this respect, note that it has been also suggested that the visual representations of the surface, concerning the perception of its spatial shifts – recalled when discussing the sets of evidence

in favor of Option 3 – occur in an unconscious manner.⁴ Thus, those sets of evidence seem to support that Option 3b is the case: we *simultaneously see* both the surface and the depicted object, while *consciously* seeing one of them and *unconsciously* seeing the other. In particular, the nature of usual picture perception is captured by the case in which we consciously see the depicted object while unconsciously seeing the surface (for a review see Nanay 2011, 2017), i.e. Option 3βii.

But Option 3b suggests that, though most of the time the simultaneity needed in order to enter pictorial experience is not about conscious representations of both the surface and the depicted object, there are cases in which such a simultaneity can be reached. For example, when we appreciate a picture in an aesthetic manner, that is, when in front of an object in picture, in order to have an aesthetic appreciation, we need to consciously perceive the picture's surface, which is vehicle of the pictorial content (Nanay 2005, 2010a, 2016, 2017; see also Lopes 1996; 2005 and Voltolini 2013).⁵ If so, simultaneous consciousness is not necessary for picture perception but only for aesthetic appreciation of pictures (Nanay 2010a, 2016, 2017).

However, there is someone in the literature who denies the possibility of this scenario (Hopkins 2012), thus endorsing Option 3c and, *ipso facto*, ruling out also the *possibility* of simultaneous conscious representations endorsed, only in special cases, by Option 3b and the *requirement* of simultaneous conscious representations endorsed by Option 3a. One crucial line of argument for Option 3c has been recently offered. If both the surface and the depicted object were simultaneously part of our visual phenomenology, pictorial experience would be a very weird visual experience.⁶ Indeed, since pictorial space and real space have a different phenomenological spatial structure (Hecht et al. 2003; Vishwanath 2014; Nanay 2011), we would experience disjointed spatial qualities, with respect to the surface and to the pictorial content it visually encodes. However, Nanay suggests,

If we are simultaneously attending to both the depicted scene and the picture surface, then there seems to be something contradictory or disjoint about our simultaneous experience of both of these. But, crucially, this objection does not apply if pictorial twofoldness is understood not as simultaneous attention, but as simultaneous (conscious or unconscious) representations.

(Nanay 2015: 192; see also 2017: §2)⁷

All this seems to show that we should endorse Option 3c at the expense of Options 3a and 3b. Thus, we can maintain that, in ordinary picture perception, since we appreciate a pictorial content, we consciously see the depicted object while unconsciously seeing the surface (i.e. Option 3βii).

Summing up, I suggested (and explained how) this open debate is fueled by the fact that the literature mainly focused on defining which is the best option between Options 3a, 3b, and 3c (Nanay 2010a, 2011, 2017; Lopes 2005; Briscoe 2018; Hopkins 2012; Kulvicki 2006, 2009; Ferretti 2017b, 2018a, 2018b; Newall 2009, 2011; Voltolini 2013, 2015; Chasid 2014; Levinson 1998; Feagin 1998), a debate that follows the original dispute between Wollheim (1987, 1980, 1998) and Gombrich (1960) (see Nanay 2017; Ferretti 2018a). Here I want to bypass a possible commitment to Option 3b or 3c and assume that, if we accept a neutral notion of simultaneity as suggested by Option 3, then Option 3c is a reasonable position, inviting speculation on Option 3βii, that, in pictorial experience, we consciously see the depiction while unconsciously seeing the surface.

At this point, however, the reader should be convinced that these three options can be discussed only with the proviso that we accept Option 3 at the expense of Options 1 and 2. And this can, in turn, be done only by showing that we perceive the surface. I sketched the arguments in favor of this idea.

All this entails that, in case our arguments for Option 3 were not reliable, all the debate in picture perception about the sub-options of Option 3 would be in trouble.

In what follows, I first analyze the inference at the basis of the argument for Option 3 and suggest that this is not completely reliable, with respect to the phenomenological and the experimental evidence it combines. Then I offer a more reliable empirical argument, which draws from phenomenological and experimental evidence concerning the perception of presence in picture perception, in order to defend the claim that, in ordinary (nonillusory) picture perception, we need to visually represent the surface (along with the visual representation of the depiction).

The surface

We saw that, at the phenomenological level, as we move we cannot perceive depicted objects as offering spatial shifts. Accordingly, it has been suggested that the empirical explanation is that the perception of the spatial shifts of the surface modulates our compensation of the spatial shifts of the depicted object: the fact that we perceive the surface and its spatial shifts leads us to make a visual compensation so that we do not perceive the spatial shifts of the depicted object. This is invoked as an evidence for the fact that Option 3 *needs to be* the case. Accordingly, as we saw, in line with the notion of simultaneity expressed above, which suggests that we consciously see only the depicted object, it has been claimed that, in these cases, we unconsciously see the surface (and its spatial shifts) (in line with Option 3c).

Unfortunately, it is not quite safe to invoke the evidence about spatial shifts in order to defend the idea that *we always need to* visually represent (even if unconsciously) the surface (along with the depicted object, i.e. Option 3) in picture perception. Consider the following argument:

- i Lack of perception of spatial shifts related to the depicted object depends on (the perceptual fact that the compensation is related to) our perception of the surface.
- ii We do not see the spatial shifts related to the depicted object.
- iii Thus, we perceive the surface.

Now, (ii) is a phenomenological claim, but is subject to at least two contrasting interpretations. An important fact to consider, again, is that “the retinal image specifies a different scene, but we normally do not notice the changes” (Vishwanath et al. 2005: 1401). One might argue, in line with the standard explanation, that the perception of the surface influences the way we perceive the depicted object, as this leads to a compensation related to the pictorial space, see (i) (for a critical review see Nanay 2017: 5.1; 2011: 472, Briscoe 2018: §3). Another reading in contrast with the previous one, however, is that we simply do not focus on the distortions of the retinal image, suggesting that we do not need to postulate that there a compensation deriving from the perception of the surface (Koenderink et al. 2004; see the recent analysis by Briscoe 2018: §3). Thus, we are not really sure that we have a unique explanation from vision science for the phenomenological evidence described by (ii).⁸

Here is a related important point. By contraposition from (i) it follows that when we do not perceive the surface and its spatial shifts, we can perceive the spatial shifts related to the

depiction. One might argue that, while with both *trompe l'oeil* and *anamorphic* paintings it seems possible to perceive spatial shifts (at least concerning some aspect of the depicted scene), only with *trompe l'oeils* it seems that we do not perceive the surface. Thus, one might be tempted to suppose, even if this does not follow deductively from (1) and (2), that perceiving the surface, this meaning that we perceive its spatial shifts, leads us to avoid the perception of spatial shifts with respect to the depicted object. Therefore, for contraposition, when we perceive the spatial shifts related to the depicted object, we do not perceive them with respect to the surface (which is, indeed, not appropriately perceived). However, if with *anamorphic* paintings we can perceive the presence of a surface, this means that there is a case in which we perceive both the surface and the spatial shifts related to the depicted object. Thus, the notion that we do not perceive the spatial shifts of the depicted object because we perceive the surface (and compensate for the pictorial space), related to the notion that the perception of the surface avoids the perception of spatial shifts with respect to the depicted object, might turn out not to be true. It follows that we cannot safely support the view that we do not perceive the depiction as distorted because we always perceive the surface and its spatial shifts (and, accordingly, we cannot support the view that, since we perceive the surface and its spatial shifts, we do not perceive the depicted object as distorted). But if the former perceptual phenomenon is not explained by the latter, then, we do not have strong reasons to suppose that we always visually represent the surface. I do not want to analyze this second, non-deductive line of argument here. However, what I've been saying here is sufficient to suggest that, at this point, we might want to invoke another argument to defend the idea that we perceive the surface in picture perception (iii) and justify the current debate. I will offer such an argument, which draws on phenomenological and experimental evidence about the perception of presence. Invoking this kind of argument is important also for another reason. Since spatial shifts are noted only with respect to movement, it may be in principle possible to argue that we (unconsciously) visually represent the surface as we move but that, when we do not move, we only visually represent the depicted object.⁹

Perceiving surfaces: the argument

Here is the argument I offer here to claim that, in picture perception, *we always need to* (S) perceive the surface:

(P1) When, in ordinary picture perception, we can't/don't visually represent the surface (non-S), but only the depicted object, the latter is able to foster in us the *visual feeling of presence*: it looks like a real, present object we can interact with (as in the case of *trompe l'oeil* pictures) (P)—(If non-S, then P).

A statement equivalent to (P1) (by contraposition) reads:

P1★ When, in ordinary picture perception, the object does not look present (non-P), we visually represent the surface (S)—(If non-P, then S).

We also know that:

(P2) Normal pictures do not, in *normal conditions*, foster in us the visual feeling of presence: what we see is a depicted object, not a normal, present one it seems we can interact with (non-P).

This leads to conclusion (C) via *modus ponens*,

C In usual picture perception we visually represent the surface—(S).

P2 is uncontroversial in the light of phenomenological evidence. As we saw in the introduction, the idea that in *normal conditions* the depicted object is seen as such, and not as a normal, present object we can interact with, is taken to be an uncontroversial idea about the visual phenomenological aspect of ordinary picture perception (Matthen 2005; Ferretti 2016c, 2017b, 2018a, 2018b; Nanay 2015; Briscoe 2016; Aasen 2015; Pettersson 2011; Noë 2012; Hecht et al. 2003). Hence, in order for the argument to be sound, in what follows, I advocate for P1 by invoking empirical evidence about the functioning of our visual system.

Vision science provides compelling evidence for P1 and P1[★], based on experiments where the surface of a picture is not properly visible, giving depicted objects presence.

Subjects are made to look at a depicted scene monocularly through an oval aperture. The aperture is located in front of the eye such that it occludes the rectangular boundary of the image (the frame—and its boundaries—of the picture’s surface). The subject’s report that the depicted object is perceived to have presence, occupying a portion of the action space in front of the subject (Vishwanath and Hibbard 2013: 1674; Vishwanath 2014: 153). This is also confirmed by *psychophysical* and *phenomenological* evidence (Vishwanath 2014: 174, 224, 225; Vishwanath and Hibbard 2010, 2013; Ferretti 2016c: 2.4; Barry 2009) that, when the surface is not visible—for example, due to the invisibility of contours—even depicted objects can look present to the observer (Vishwanath et al. 2014; Ferretti 2016c). As Vishwanath and Hibbard state:

When a picture is viewed normally with both eyes, the picture’s surface is visible because of cues such as binocular disparity and the visible frame of the picture [...]. Distance cues such as binocular convergence, vertical disparity, and the accommodative state of the lens specify the distance of this visible picture surface [...] rather than the pictorial contents [...]. There are no known optical cues that specify the distance of pictorial objects from the observer. Therefore, under binocular viewing of pictures, although 3-D object shapes can be clearly perceived, their scale and absolute depth should remain optically unspecified.

(Vishwanath and Hibbard 2013: 1682–1683; see also Vishwanath 2014: 159–160)

However, in the experimental setup, “Monocular aperture viewing removes the main cues that specify the presence of the picture surface (binocular disparity and the visible frame), as well as binocular cues specifying its distance (convergence and vertical disparity). However, subsidiary distance cues, such as the accommodation state of the lens, are still present” (Vishwanath and Hibbard 2013: 1683). Thus, this experimental evidence suggests that, “In the absence of visible picture surfaces, it is plausible that the brain attributes the accommodation response to the pictorial objects, and assigns any associated distance information to them, allowing absolute depth values to be derived” (Vishwanath and Hibbard 2013: 1683).

At this point, the reader should note that egocentric absolute depth concerns the fact that the “observer has knowledge of the depth relations scaled in some meaningful way to the actions of the observer” (Vishwanath 2011: 222; see also p. 206). That means that ascribing absolute egocentric depth values to the objects we deal with in our environment is what leads us to visually represent an object as present in our action space and as offering reliable possibility of motor interaction (Ferretti 2016c). This is not to say that we cannot perceive other depth properties in the pictorial space. For example, we can visually ascribe relative depth to the depicted object, that is, i.e. “metric relative depth relations within and among objects, including 3D surface shape, slant, depth order, and so on, all of which imply an understanding of the ratios of distances or depths among points in the visual field” (Vishwanath 2011: 222).

This evidence suggests the following. When a subject ascribes egocentric absolute depth to a picture's surface—an ascription that is responsible for the stereoscopic visual representation of an object as present in our action space for suitable motor performance—it cannot be simultaneously ascribed to the depicted object. Thus, the depicted object lacks presence.

This evidence supports P1 and P1★. However, they also show another important perceptual fact:

PP1 When we visually represent the surface (S), the depicted object does not look present (non-P) or (if S, then non-P).

Thus, for contraposition:

PP1★ When the depicted object does look present (P), we do not visually represent the surface (non-S) or (If P, then non-S).

Let us analyze more slowly this point. On the one hand, the evidence directly supports PP1 (If S, then non-P). Indeed, ascribing absolute depth to the picture's surface, which then looks present, leads to the impossibility of ascribing it to the depicted object, which looks pictorial. This entails, for contraposition, that when the object does not look pictorial, but present, this is due to a failure to ascribe absolute depth to the picture's surface; the surface is not visible and its presence cannot be tracked by our visual system, as absolute depth cannot be ascribed to it (PP1★) (If P, then non-S). Accordingly, when the surface is not visible, our visual system cannot ascribe absolute depth to it and in turn automatically ascribes depth to the depicted object, which then looks present in our action space for suitable motor action.

Crucially, on the other hand, this circles back, as showed by the evidence, for support for P1 (If non-S, then P). This entails, for contraposition, that when the object does not look present, but pictorial, that means we have the possibility of ascribing absolute depth to the surface, which is visible and can, thus, be tracked by our visual system. This empirical evidence strongly confirms P1★ (If non-P, then S), which, along with P2 supports my argument for Option 3 that, in ordinary (non-illusory picture perception) we visually represent the picture's surface.

In general, what is important for the purpose of this paper is that these results from vision science suggest that the reason why we do not visually represent, during picture perception, the depicted object as present, is that surface visibility plays a crucial role in the induction of the visual feeling of presence of it. Therefore, the fact that we visually represent the vehicle/surface as present hinders (the possibility of visually representing) the presence of the depicted object (Vishwanath 2014: 164; Ferretti 2016c: 2.2, 2017b, 2018b). Accordingly, when the visual representation of the surface is not possible, what effectively is a depicted object looks present. Of course, when I say that we do not visually represent something, I mean that we do not visually represent it either consciously or unconsciously: we cannot rely on any visual representation of it. In other words, in this case the visual contents of what effectively is pictorial experience does not include picture-experiencing contents, and we undergo a particular form of illusory visual experience.

Summing up, ordinary picture perception is binocular. Binocular vision leads to correctly represent, in normal cases of picture perception (i.e. non-illusory pictorial perception such as the one à la trompe l'oeil), the picture's surface, which is perfectly visible. This in turn allows an observer to properly ascribe egocentric absolute depth to it. Therefore, we do not visually represent the depicted object as present. However, when surface visibility is lacking, also due to

the invisibility of the contours “distance information [...] is assigned to the pictorial object allowing a derivation of size and absolute depth values” (Vishwanath 2014: 160; see also Vishwanath and Hibbard 2013), thus enhancing the visual feeling of presence of the depicted object.

Crucially, this evidence is a sort of litmus test concerning the presence of a representation of the surface in everyday picture perception. Indeed, this suggests that, in normal cases, our visual representations are simultaneously attuned to the surface and its contours, even if we might think they are not. This is what allows our visual system to properly visually assign the related distances to both the picture’s surface and the depicted object and to visually represent only the former as present. This perceptual process hinders the possibility of a visual representation of the depicted object as present. If it were not the case, we would visually represent the object as present, because we would not be able to track and visually represent any surface. This evidence suggests the importance of the simultaneous occurrence of the perception of the surface/vehicle and of the depicted object, i.e. that Option 3 is the case. The simultaneous experience of these two perceptual states is crucial in order to enter pictorial experience.

Now, so far I’ve been talking about a visual representation of the surface, without specifying whether it is conscious or unconscious. Furthermore, I did not discuss the implications of the evidence reported above for the case of *trompe l’oeil* pictures. I now turn to applying the empirical evidence presented above to tackle both of these issues. I will argue that our visual representation of the surface in picture perception is unconscious Option 3c as well as that with *trompe l’oeil* pictures we do not visually represent, either consciously or unconsciously, the picture’s surface.

Special pictures and viewing conditions

As mentioned above, there are cases in which we effectively are in front of a picture that, nonetheless, produces the illusion that the depicted object is a real, present one. This is perfectly clear in the case of *trompe l’oeil* pictures, which are skillfully constructed in such a way that (even in binocular conditions and without apertures, as in the experimental settings reported above) the visual system of the observer cannot properly detect the picture’s surface and is thus fooled by the illusory presence of very enhanced visual depth cues. *Trompe l’oeil* depictions make picture perception very interesting: they show that simply being in front of a surface does not entail that we can (properly) visually represent it. This perceptual phenomenon can be plausibly explained, in the light of the evidence above discussed, by saying that we cannot visually represent the presence of any surface. Consider, again, PP1:

PP1 When we visually represent the surface, the depicted object does not look present (If S, then non-P).

This is equivalent, by contraposition, to:

PP1★ When the depicted object looks present, we don’t visually represent the surface (If P, then non-S).

But we also have the phenomenological evidence that:

PP2 In the *trompe l’oeil* case, the object does look present (P) (Nanay 2015, 2017; Ferretti 2016c, 2018b).

Thus, (by *modus ponens*):

(C2) In the *trompe l'oeil* case, we do not visually represent the surface (non-S).

At this point, as we saw above, all is determined by what we mean by “visually represent” here, as in the other cases discussed above. Visual representations can be either conscious or unconscious. So, we have two options here:

- a With *trompe l'oeils*, we do not visually represent the surface either consciously or unconsciously (we do not track it at all).
- b With *trompe l'oeils*, we do visually represent the surface unconsciously.

As pointed out above, when I say that we do not visually represent something, I mean that we do not visually represent it either consciously or unconsciously: we cannot rely on any visual representation of it. Thus, here I am defending (a): since surface tracking is disrupted, *trompe l'oeil* perception produces an illusory visual experience.

When experiencing the effect of a *trompe l'oeil* picture—when we experience the depicted object as present—we cannot shift (even if momentarily) our conscious visual experience to the picture’s surface. This is because we have no visual representation, not even an unconscious one, of it – note that, if we claimed that with *trompe l'oeils* we unconsciously see the surface, then, that would mean that both ordinary and *trompe l'oeil* experience are captured by Option 3βii, which is not possible (Ferretti 2018a, 2018b).

We can analyze this point on *trompe l'oeil* perception in order to say something interesting about ordinary picture perception. With normal pictures, the possibility of relying on an at least unconscious representation of the surface leads to the possibility of consciously experiencing the depicted object, without experiencing it as present. Accordingly, this also allows to the possibility of shifting our conscious visual experience onto the surface. (This is possible by consciously accessing the unconscious representation of the surface; Ferretti 2017c, 2018b).

In this respect, I need to state that I am not against the idea that, sometimes, we can consciously perceive the surface in ordinary picture perception (i.e. we can, sometimes, shift our conscious focus from the depicted object to the presence of the surface). Note, however, that I maintain that when we consciously see the surface, we do no longer consciously perceive the depicted object anymore (while, arguably, perceiving it only unconsciously). Thus, when I am talking about shifting conscious experience between the surface and the depicted object, my account of picture perception satisfies the conditions of Option 3c. (There is no simultaneous consciousness of both the depicted object and of the surface, as suggested by Options 3a and 3b.). This is perfectly compatible with the case described by Option 3βii. All I am saying crucially suggests something important about usual (non-illusory) picture perception: in order not escape the pictorial illusion that the depicted object is present, we need to build a representation of the surface; and this representation is unconscious (see also Ferretti 2018a, 2018b: §§ 4.3, 4.4).

So, this point about *trompe l'oeil* pictures is not trivial. First, it suggests that, in usual picture perception, the visual representation of the surface is unconscious. Second, it shows that, with *trompe l'oeil* pictures, we cannot rely on any representation of the surface, not even an unconscious one. Finally, in the literature it is suggested that, in the case of *trompe l'oeil* perception, we experience the feeling of presence because something happens to the perception of the surface. However, it is not always clear whether in *trompe l'oeil* perception we cannot

see the surface either consciously or unconsciously (a) or, rather, we can't consciously see the surface and we see it only unconsciously (b). By providing an account of *trompe l'oeil* perception that illuminates ordinary picture perception, I am breaking from the literature which has used it as a problem case for picture perception (Wollheim 1987, 1998; Gombrich 1960; Lopes 1996, 2005; Nanay 2011, 2015, 2017; Hopkins 2012; Newall 2011; Kulvicki 2006, 2014; Ferretti 2016c, 2017a, 2017b, 2018a, 2018b; Voltolini 2013, 2015; Chasid 2014; Cavedon-Taylor 2011). Finally, as anticipated, the argument related to the perception of presence of the surface explains why we perceive a pictorial content without the need of invoking the movement of the observer, as *trompe l'oeil* illusions can have an effect even on static observers; this is something that is not possible when invoking the role of the perception of the surface by using the argument of spatial shifts, which, indeed, need movements by the observer.

Conclusion

To conclude, empirical evidence suggests that perceiving the picture's surface is crucial in ordinary picture perception.¹⁰ When surface perception fails, there is a breakdown of the simultaneity needed in order to enter the peculiar visual state involved in ordinary picture perception. In these cases, we fall into a situation *à la trompe l'oeil*, which is, indeed, similar to real object perception. The unique difference is that, in the *trompe l'oeil* case, a surface is present, even though we cannot see it. For this reason, the depicted object is deceptively visually represented as present. Differently, in real object perception, no surface is effectively present.

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Notes

- 1 Of course, this is not the case with *anamorphic* paintings, in which spatial shifts are detectable. However, like *trompe l'oeils*, *anamorphic* paintings are special pictures. The great majority of paintings are not *anamorphic*, showing a fixed perspective (Nanay 2011: 471, 472; Vishwanath et al. 2005; Maniatis 2017).
- 2 The reader should not interpret that, when talking about what is "required" in order to enter pictorial experience, my view is grounded on *inferences to the best explanation*, as most claims based on empirical experiments are.
- 3 I offered elsewhere (Ferretti 2018a) a more meticulous analysis of this point, related to the debate between Gombrich and Wollheim.
- 4 For a critical discussion of this point see Nanay 2017: 5.1; Ferretti 2017b; Vishwanath et al. 2005; Nanay 2017; Briscoe 2018; Koenderink et al. 2004; Maniatis 2017.
- 5 I do not focus here on the aesthetic appreciation of pictures, which might be taken as paradigmatic cases in which we consciously see both the surface and the depicted object.
- 6 See the discussion by Nanay 2017 of the argument offered by Hopkins 2012.

- 7 The notions of “visual awareness,” “visual consciousness,” “visual attention” and “visual experience” used in the Wollheimians/Gombrichians traditional debate on “simultaneity” are usually ambiguous (Nanay 2005, 2011: 463, 2015, 2017: §3; Hopkins 2010, 2012; Voltolini 2015; Lopes 2005; Briscoe 2016, 2018). Someone uses the notion of “visual attention” and “conscious visual attention” interchangeably, because the debate about the relationships between visual attention and visual consciousness is still open (Nanay 2011: 474; 2017: §3 n. 9). Here I will talk about visual “experience” or “consciousness,” concerning “the personal level of visual processing,” and of “unconscious vision,” concerning the “subpersonal level of visual processing,” in a very general and neutral way. When I argue that something cannot be either consciously or unconsciously perceived, this claim is maintained in any sense of “conscious.” Thus, even if someone is committed to the idea that attention can be conscious or unconscious, when I say that we do not consciously or unconsciously represent something, it also entails that we do not attend to this thing either consciously or unconsciously: our visual system cannot track it at all.
- 8 Indeed, the debate about a final explanation of the phenomenon of spatial shifts with pictures is still open; see Maniatis 2017; Nanay 2017: 5.1; 2011: 472, Briscoe 2018: §3; Erkelens 2013; Papathomas et al. 2010; Todorovic 2008.
- 9 I recognize the perceptual fact concerning spatial shifts as being an important difference between perceiving a depicted object and perceiving a real object. However, since this difference needs movement from the observer in order to be appreciated, while the feeling of presence can be appreciated also in static conditions, I will not focus on this difference in this paper.
- 10 The aim of the present paper was an investigation the status of *everyday pictorial* perception, avoiding special cases of picture perception. Despite this, I am recalling cases regarding experimental settings that are far from common situations of picture perception. But this is only because particular experimental settings that go beyond normal conditions of pictorial perception can lead us to discover relevant perceptual facts about the real nature of everyday experience of pictures.

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18

IT'S NOT AS BAD AS YOU THINK

Olfaction and informational richness

Clare Batty

It is often said that our sense of smell is not very good. What typically follows such a claim is a comparison. We can sum up the two most common ones initially as follows:

The intraspecies comparison In comparison to human vision, human olfaction is inferior; and
The interspecies comparison In comparison to animal olfaction, human olfaction is inferior.

The intraspecies comparison has been the focus of a recent debate in the philosophical literature on olfaction. The interspecies comparison, while unexplored in the philosophical literature, has recently been challenged in its scientific counterpart. In this paper, I consider each of these discussions. As we will see, in thinking critically about the content of both of these comparisons, we arrive at multiple ways to understand the claim that human olfaction is inferior, or, as it is sometimes put, informationally poor. However, I will show that, in doing so, we also arrive at multiple ways to vindicate the richness of human smell.

Informational richness: the intraspecies comparison

Up until the early 2000s, philosophical discussions of olfaction were rare. However, the recent effort to explore, and assess, the dominant visual model of theorizing about perception has produced a substantial, and growing, body of philosophical work on olfactory perception.¹ Not only does William Lycan's "Slighting of Smell" (2000) kick off that body of work, it is, as we will see, the source of a central debate in that literature. Lycan's aim in this paper is to explore how the philosophy of perception has been shaped by its focus on vision. In introducing those aims, and with them the question of the suitability of generalizations from vision, Lycan claims that "vision is not a typical sense modality at all, but a very unusual, unrepresentative example of one" (2000: 273) and that, given this, "we may expect to find that the philosophy of perception has been warped and skewed by its persistent focus on vision" (2000: 273). His point of comparison is olfaction. Central to Lycan's discussion, then, is an intraspecies comparison. He argues that, if philosophers had started with olfaction as opposed to vision, the history of theorizing about perception would have taken a much different path—with different questions, challenges, and views demanding our attention.²

In arriving at this conclusion, Lycan considers a set of “general respects of similarity and difference between the senses” (2000: 277) and argues that, with respect to each, olfaction diverges significantly from vision. Most of these “general respects of similarity and difference” are in fact points of *difference* between human visual and olfactory experience. The first, and fundamental, difference that Lycan cites is a difference in *informational richness*. In the recent philosophical literature on olfaction, Lycan is the first to make the observation that olfactory experience seems to lack the informational richness enjoyed by visual experience; in fact, he claims that olfactory experience is “informationally very poor” (2000: 277). In terms of the debate about olfaction, then, Lycan initiates it with the intraspecies comparison. And, while his aim is the more general one of drawing attention to how the philosophy of perception would have gone if we had started with olfaction instead of vision, the considerations that he raises, and observations that he makes, serve to provide an initial, “rudimentary” (2000: 273) pitch in favor of the intraspecies comparison above.

On what grounds does Lycan claim that, compared to visual experience, olfactory experience is informationally very poor? Lycan says very little about informational richness itself. But we can begin to understand what he means if we look at some of his other points of difference. And we get much more of an idea if we consider his next: the degree to which both visual and olfactory experience support what I will call a world-directed view of perceptual experience or, as he puts it, their *degree of objectification*. It is important to note that, although Lycan argues elsewhere that olfactory experience is indeed world-directed, he is consistent throughout in the claim that the *phenomenology* of olfactory experience does not support such a view. By “phenomenology” Lycan means something in particular—namely, the phenomenal character of one’s experiences when “one merely concentrates [on those experiences] passively and at a time” (2000: 279). Given this, as I reconstruct Lycan’s views about informational richness in this paper, they are to be understood as views about the phenomenology of both visual and olfactory experience conceived of in this way. In turn, if we are to attribute the intraspecies comparison to Lycan, we must do so in these terms. As we will see, the debate about informational richness, and the intraspecies comparison, that Lycan precipitates also largely adopts those terms.

World-directed views are typically characterized as those according which perceptual experience puts us into contact with objects and properties in the external world—objects that, as we take them, could exist unperceived. Visual experience, of course, achieves a high degree of world-directedness. It is capable of predicating properties to a wealth of apparent external objects, and, as Lycan observes, those objects are such that we are able to take up multiple perspectives toward them. While its predicative structure certainly makes visual experience eligible for a world-directed view, its perspectivalness, Lycan claims, secures its status as supporting such a view. But, as Lycan notes, olfactory experience lacks these features. In one of two oft-cited observations in his paper, Lycan claims, “considered only phenomenologically, a smell seems a modification of our own consciousness rather than a stable property of a perceptual object that would exist unperceived” (2000: 277). If Lycan’s observations about phenomenology are accurate, then no external object is presented in olfactory experience such that we are able to experience it from a variety of perspectives. As he claims, “the idea of an olfactory perspective makes little sense unless founded on an extraneous mode of sensing” (2000: 277).

Many of Lycan’s other dimensions of similarity and difference provide further explanation of just what it is olfactory experience lacks in failing to support a world-directed view.³ He again stresses the fact that visual experience has a predicative structure, and a particular form of one—i.e. one in which the properties presented by it (e.g., color) appear to be properties of external objects. Because of this structure, the visual field has a “geometry” (2000: 279), in which colors and shapes form sensory individuals that, in turn, bear spatial relations to one another. Olfactory experience does not exhibit any kind of geometry, he claims. As a result,

it would seem, it fails to predicate properties of external objects. As Lycan observes, “phenomenologically, an odor is just within us, happening right in the center of our minds” (2000: 278). He makes a similar point when he observes that a resemblance claim does not hold in the case of olfactory experience. He claims that, because of its geometry, we naturally assume that the elements of the visual field—the patches of color of various shapes and spatial relations to each other—resemble objects occupying the external world. In the case of olfactory experience, however, a resemblance claim gains little traction. As Lycan claims, olfactory experience does not exhibit the structure enjoyed by vision; as a result, there are no “figures” of which to ask the degree to which, or the respects in which, their presentation in experience matches any object in the external world.⁴

Observations drawing attention to the lack of a perceptual object in olfactory experience are echoed in Lycan’s further claim that olfactory experience does not lend itself to a particular kind of world-directed view—namely, a representational view. Echoing one way of characterizing representational content, there is a way that the world—indeed, things in it—appear to us when we have a visual experience. But, as Lycan notes previously, there is no analogue claim for olfactory experience—at least not one that is supported by its phenomenology. In a second oft-cited passage, he observes: “phenomenologically speaking, a smell is just a modification of our consciousness, a qualitative condition or event in us ... and conventional wisdom has it that qualia merely linger uselessly in the mind, and do not represent” (2000: 281). Unlike visual experience, then, there seems to be no way that things in the world appear to us when we have an olfactory experience—at least no way that is evident on the basis of olfactory experience alone, and without inference. Although elsewhere Lycan (1996, 2014) argues that olfactory experience is indeed representational, he thinks that its phenomenology cannot uphold such a view.

Related to this is a final point of difference between visual and olfactory experience—namely, whether each misrepresents or, more neutrally, is ever inaccurate. While examples of visual illusions are rife, Lycan observes, examples of olfactory illusions are hard to come by. One can see how this may be so, if olfactory experience does not present external objects. If this is true, not only is it unclear how any thing could appear to be thus and so, but it is also unclear how any thing could *inaccurately* appear to be thus and so.

As we can see, then, Lycan’s respects of similarity and difference largely consider not merely the question of whether olfactory experience is world-directed, but whether it is world-directed in a particular way. That is, they consider not only whether the *world* appears to us in olfactory experience but whether *particular objects* in it do. As we have been told, compared to other sense modalities, vision is informationally rich; it is “king,” as Lycan puts it. Olfaction, on the other hand, is “informationally very poor.” Given the differences in their phenomenology cited by Lycan, we can understand “informational richness,” then, as a feature that an experience (or experience type) has when it is, what we can call, “object-rich”—i.e. when it presents to a perceiver an external world occupied by a variety of individual objects, bearing spatial relations to one another, each of which appears to have certain perceptible properties. That is to say, an experience is object-rich when its phenomenology exhibits a certain kind of perceptual organization.

As Lycan observes, visual and olfactory experience differ with respect to object-richness. Presented with a rose over a breakfast of a freshly baked croissant, one’s visual experience is organized in such a way that the rose and the croissant appear as individual objects, bearing spatial relations to one another, and each appears to have certain perceptible properties. Such an experience (typical of vision) is, thus, object-rich. We have learned that, according to Lycan, the same cannot be said of an associated olfactory experience. One might be able to distinguish the rose property—“rose-ness”—and the croissant property—“croissant-ness”—in a given experience.⁵ But such an experience is not organized in such a way that any individual objects

appear (the rose, the croissant, or their emanations), bearing spatial relations to one another, and each appearing to have “rose-ness” or “croissant-ness.” Such an experience is, thus, object-poor. In fact, it would appear that it is not object-based at all.

Given this, we can define Lycan’s version of the intraspecies comparison as follows:

The intraspecies comparison. In comparison to the object-richness of human visual experience, human olfactory experience is “object-poor.”

With this, we now have an understanding of our initial intraspecies comparison, of the claim that olfactory experience is inferior to visual experience. Because olfactory phenomenology does not ever seem to exhibit the perceptual organization of visual phenomenology, it is inferior with respect to the information it serves up and, in particular, inferior with respect to its presentation of objects. Indeed, it would seem, it presents no objects at all.

The philosophy of olfactory perception has largely accepted Lycan’s observations about olfactory phenomenology—that it lacks the kind of perceptual organization that visual experience enjoys. Indeed, one of the most commonly cited observations in the philosophical literature on olfaction is that while visual experience clearly seems to present us with an external world of objects and properties, olfactory experience does not. Still, although there appears to be something right about the claim that the phenomenology of olfactory experience does not support a world-directed, or indeed object-based view, it seems, at the same time, counterintuitive. The olfactory system is a *sensory system*, after all. And sensory systems have evolved to tell us about our environments. At the very least, then, it ought to be the case that olfactory experience is world-directed. What has followed from Lycan’s paper, then, is a series of papers grappling with these observations about phenomenology and the implications of them for the view that the olfactory system functions in just this way. In particular, these papers have considered two core questions raised by the intraspecies comparison. They are the questions of:

- 1 whether, or to what degree, olfactory experience is world-directed; and
- 2 what objects, if any, are presented in olfactory experience.

In response to these questions, philosophers have challenged the intraspecies comparison, arguing that olfactory experience is more informationally rich than this overly strong version of the comparison would have it. In what follows, I will consider the central papers dealing with (1) and (2).

Before turning to them, however, it is important to draw attention to a line of response that is not generally taken. One might think that, in order to address these questions, we must immediately distinguish between “synchronic” olfactory phenomenology and one that seems ubiquitous to olfaction—namely, “diachronic” phenomenology.⁶ The former, as we know, is Lycan’s focus. But, the response continues, we often use our sense of smell to search for objects in our environments. For example, when I am greeted with “lily-ness” when I enter the house, I am able to follow that scent to its source, in a vase in the kitchen. I do so by moving about and sampling the air around me with my nose. In doing so, I keep track of where lily-ness appears. But I can also keep track of where lily-ness does not appear. To be sure, my nasal search may simply follow a trail of increasing intensity without ever requiring me to determine where the property is *not* instantiated. But, as the response goes, presumably I could do so if required or desired. Not only does such a process aim at presenting a “source object,” then, it can also provide a mapping, over time, of the region occupied by its odor—the collection of molecules given off by the lily.^{7,8} If we think of collections of airborne

molecules as objects, then diachronic olfactory phenomenology is arguably able to present particular objects.

Despite the ubiquity of these cases, as well as what they plausibly show, the majority of the literature responding to Lycan's claims regarding informational richness adopts his "passive sense of 'phenomenology'" (2000: 279)—and, indeed, the challenge of showing how, even so conceived, olfactory experiences are richer than Lycan suggests. A notable exception to this is a very recent discussion of diachronic identity in Millar (2017). I will return to that discussion below.

Turning to (1), then, the central work is Richardson (2013). In this paper, she defends the view that olfactory experience is exteroceptive, that it presents things outside of the body. In doing so, she rejects two views about olfactory phenomenology:

- a Lycan's view that it supports only the claim that olfactory experience presents properties of experience itself (i.e. the "orthodox view"); and
- b Kant's view that it supports the claim that olfactory experience presents states, or conditions of the body (i.e. the "interoceptive view").

She rules out each of these views by drawing attention to the role that sniffing plays in smelling and, in particular, the contribution it makes to olfactory phenomenology. "Sniffing," Richardson claims, denotes both passive breathing as well as active sniffing. In drawing attention to their contribution to olfactory phenomenology, she defuses the claim that the alleged exteroceptivity of olfactory experience is grounded in an inference made on the basis of the tactual phenomenology involved in sniffing.⁹ She shows how that proposal is based on questionable commitments about (i) the individuation of the senses and (ii) how one's overall perceptual experience is composed of its modality specific parts. Given considerations of space, I leave the details of Richardson's argument to the reader. However, for present purposes, what is key to stress is that her argument does not rely on showing that olfactory phenomenology has any more organization than Lycan claims it does. She grants his observations while drawing attention to other aspects of phenomenology to ground the claim of world-directedness.

Richardson, then, paves the way for answering (2) and for dealing directly with Lycan's intraspecies comparison_o. Like visual experience, olfactory experience is world-directed. The next question is, then: does the phenomenology of olfactory experience support the view that it presents *objects* in the world? For the most part, the central papers dealing with this question all grant that olfactory phenomenology lacks the perceptual organization of visual experience. However, they argue that this does not show that olfactory experience is as informationally poor as the intraspecies comparison_o claims it is. Some argue that olfactory experience indeed presents objects—albeit in a distinctive way. Others, in introducing other ontological categories into the debate, exploit a distinction between presenting properties of nothing (i.e. experience being feature-based) and presenting properties of no thing (experience's failing to be object-based).

In two previous papers (Batty 2010a and 2011), I address Lycan's intraspecies comparison_o, arguing that, although olfactory phenomenology does not achieve the kind of perceptual organization enjoyed by its visual counterpart, it nonetheless represents objects. In particular, I argue that a lack of spatial organization does not entail a lack of predication. Drawing on the distinction between object-involving and existentially quantified content as it has been discussed for the visual domain, I argue that olfactory content is existentially quantified and, that for any olfactory circumstance, olfactory experience represents that there is "something or other, here, with certain olfactory properties." In "A Representational Account of Olfactory Experience" (Batty 2010a), I go on to argue that further considerations suggest that

these “something or others” are in fact collections of airborne molecules. However, the phenomenology of olfactory experience itself remains silent on the nature of the perceptual object. Still, as I argue, its phenomenology does not prevent olfactory experience from presenting objects. It just does not present *particular* objects. As I put it in “Olfactory Objects” (Batty 2014b), olfactory experience achieves object recognition without object individuation. In terms of the intraspecies comparison_o, while I hold that olfactory experience is not as object-poor as it claims, it is still much less object-rich than visual experience. As a result, the intraspecies comparison_o is certainly on to something.

Mizrahi (2014) disagrees. She rejects the intraspecies comparison_o full stop. While she agrees that olfactory phenomenology does not exhibit spatial organization and, as a result, does not present particular objects, she argues that olfactory experience does not present objects *at all*—even in my weak sense. Still, according to Mizrahi, this does not show that olfactory experience presents properties of nothing—i.e. that it is simply feature-based—or that it fails to be world-directed. According to Mizrahi (2014), olfactory experience presents properties of stuffs, not objects. Stuffs are not spatiotemporally located. They are also mereologically simple; they have no parts. On Mizrahi’s view, then, although a portion of rose odor-stuff is spatiotemporally located, rose odor-stuff (itself, we might say) is not. Portions of rose odor-stuff have parts; rose odor-stuff has no parts. As she argues, if olfactory experience presents properties of stuffs, as opposed to properties of portions of them, we can explain certain key features of olfactory phenomenology. As we know, unlike visual phenomenology, olfactory phenomenology lacks spatial complexity; odors, unlike visual properties, appear to be “pervasive and unlocalized” (Mizrahi 2014: 244). Moreover, as Mizrahi claims, “it seems ... that odors are simple and ... can be grasped in one sniff” (2014: 248). If olfactory experience presents properties of stuffs, we can easily explain each of these features. Again, stuffs are not spatially located. And, given that they have no parts, there is no part of a stuff that you could fail to get at in experience. One does grasp the rose odor-stuff in a single sniff.

Where does Mizrahi stand with respect to informational richness, then? She rejects the intraspecies comparison_o, after all. This is because it simply does not apply; the intraspecies comparison_o appeals to the presentation of objects and, according to Mizrahi, olfactory experience is not in the business of presenting objects. But, while a notion of object-richness does not apply to olfactory experience, she draws attention to the fact that one of richness of sensitivity and discrimination does. I will turn to issues of sensitivity and discrimination in the next section. For now, we can use this brief characterization of Mizrahi to characterize a third response to the intraspecies comparison_o—one that represents a middle ground between myself and Mizrahi. Young (2016) agrees with each of us that the phenomenology of olfactory experience does not support the view that it presents particular objects. Like me, however, he thinks that other considerations determine “the external nature of the objects of olfactory perception” (Young 2016: 2). But, according to Young, those objects are not gaseous emanations, as I hold. Rather, according to his molecular structure theory, they are “chemical objects”—“the three-dimensional molecular structures of chemical compounds diffused in an odor plume” (Young 2016: 8). Conceiving of olfactory objects in this way, Young argues, explains what is responsible for perceived olfactory qualities—something that, he claims, my view does not explain. Like Mizrahi, then, Young rejects the view that olfactory experience presents odor objects; however, unlike Mizrahi, and like me, he accepts that it presents *some* kind of object. Also like me, Young accepts the intraspecies comparison_o and characterizes olfactory phenomenology as object-poor.

So far, then, we have two views that accept the intraspecies comparison_o and place olfactory experience in an object-poor position and a third view that rejects the comparison all together. A recent paper by Millar (2018) argues that olfactory experience does in fact present

particular objects and, as a result, positions olfactory experience at an object-rich position. Although Millar argues that diachronic olfactory experience presents particular objects, she also argues that *synchronic* olfactory experience does as well. As she argues, certain Gestalt grouping principles apply to olfactory phenomenology, and, because of this, olfactory experience achieves aspatial figure-ground segregation. Figure-ground segregation, it is commonly held, is a defining feature of object individuation, or the presentation of particular objects in perceptual experience. Because she focuses on a notion of aspatial presentation of particular objects, Millar too is able to grant Lycan's observations about olfactory phenomenology. The view that she arrives at, however, distinguishes her from the rest.

I turn now to the interspecies comparison.

Informational richness: the interspecies comparison

As I noted in the introduction, the interspecies comparison has received almost no attention in the philosophical literature.¹⁰ In this section, I turn to it and, in particular, what science has to tell us about it. Science makes use of two further measures by which we can evaluate olfactory ability: sensitivity and discrimination. As we will see, the comparisons that we can construct on their basis do not focus on *what exactly* we smell but on how fine-grained our abilities are to pick up on *whatever it is* that we do smell. As a result, this further way of evaluating human olfaction can remain neutral as to whether what we smell are stuffs (as in the case of Mizrahi), portions of stuffs (arguably as in the case of Batty's emanations), or molecular structures (as in the case of Young).

As I noted above, in challenging the intraspecies comparison_o, Mizrahi explicitly draws attention to these abilities: "this affirmation seems to be contestable if the apparent poverty of olfaction is supposed to refer to its discriminatory power. As argued earlier, once it is acknowledged that smell is directed to stuffs rather than objects, smell appears to be highly sensitive and discriminative" (Mizrahi 2014: 247).

Now, it is one thing to suggest that human olfaction is "highly sensitive and discriminative" despite its phenomenology; it is quite another to say that it is just as sensitive and discriminative as that of other animals.¹¹ There is no doubt that the interspecies comparison, which denies this latter claim, has intuitive plausibility. To see that this is so, we need only to consider what we assume about our own olfactory abilities compared to, for example, those of the sniffer dog. Recently, I was caught out by a US Department of Agriculture sniffer beagle. While I stood exhausted at baggage claim, the beagle made its rounds, checking on whether passengers had brought any prohibited food items into the country. It turns out I had; I had forgotten about a sandwich I had bought at Glasgow Airport before embarking. But the sniffer dog soon refreshed my memory as it homed in on my backpack.¹² Now, when we think of this feat and, more generally, think of what the sniffer beagle can do that we cannot, several abilities come to mind. We might think that the sniffer beagle is picking up on odors that we simply cannot—as would be the case, I take it, were it to find certain drugs, and not food, in someone's luggage (not mine!). We might also think that it is able to pick up on miniscule amounts of an odor that, if only present in greater quantities, we would also be able to pick up on. Finally, given the previous two abilities, we might think that the sniffer beagle is exceptionally adept at discriminating target odors from others in the "odor soup" at their noses. The question then, is: are animals better than humans with respect to these kinds of abilities? As it turns out, the question isn't that simple, nor is the answer what we might expect.

Up until recently, the interspecies comparison has been a standard assumption even in the sciences. A recent scientific paper discusses the origins of that comparison. In “Poor Human Olfaction is a 19th-Century Myth”, John P. McGann argues that, curiously enough, the scientific version of the interspecies comparison did not originate with any sensory testing—what would be the analogue of the phenomenological approach employed by the intraspecies comparison. Rather, according to McGann, it originated in physiology—and, in particular, with a misconception about the relationship between the neuroanatomy of the olfactory bulb, higher cognitive function, and olfactory ability. Before turning to his argument, it is worthwhile to review, in brief, the role that the olfactory bulb plays in olfactory processing.

Buck and Axel (1991) famously identified a family of 1,000 olfactory receptor genes in the human genome. Approximately 390 of these genes are functional and code for a family of G-protein coupled receptors which are expressed in neurons located in the olfactory epithelia—patches of tissue that lie approximately 7 centimeters within each nostril. Axons from olfactory receptor neurons expressing the same receptor converge onto small sets of olfactory glomeruli in the olfactory bulb—a set of two brain structures located just above the nose. In humans, there are approximately 5,600 glomeruli in the olfactory bulb, allowing for roughly fifteen glomeruli per receptor type. In the glomeruli, dendrites of projection neurons receive signals from the olfactory receptor neurons and, in turn, transmit further signals to the olfactory centers in the brain. Because each glomerulus receives input from only one type of receptor, patterns of glomerular activation are thought to map onto odor identity.

As the first stage of olfactory processing, and because its organization is generally consistent across species, the olfactory bulb has been of significant interest to olfactory scientists. And, as McGann argues, it is the olfactory bulb that is at the heart of the origins of the interspecies comparison. According to McGann, the idea that human olfaction is inferior originated with nineteenth-century French neuroanatomist and anthropologist Paul Broca. In order to argue for the interspecies comparison, Broca made use of three “subcomparisons” of humans and animals. In particular, he compared:

- 1 the relative size of olfactory bulb to the brain overall;
- 2 the degree to which behavior is driven by olfactory cues; and
- 3 the capacity for higher cognitive states.

With respect to (1), Broca observed that other animals have olfactory bulbs that are larger relative to overall brain size. At the same, and with respect to (2), he observed that olfaction is the primary driver of behavior in those animals; humans, on the other hand, do not exhibit odor-driven behavior to the same degree. As McGann tells us, the difference with respect (2) was behind Broca’s categorization of humans as *anosmatique*—i.e. lacking olfactory ability. Although (1) and (2) do not indicate the interspecies comparison directly, it is easy to see how one might take them to show that such a comparison holds—that, compared to other animals, human olfaction is poor. Not only is the brain structure that is responsible for relaying receptor information to the brain much smaller in humans, behavioral indications point to the fact that either not much information is relayed to it or that any information that is relayed is not of interest enough to humans to affect behavior. Broca hypothesized that any lack of interest in olfactory stimuli is grounded in a human ability to choose responses to olfactory stimuli—an ability he hypothesized animals lack. Moreover, as McGann notes, Broca hypothesized that the difference between humans and other animals with respect to language and complex cognition—that is, comparison (3) above—corresponds to a difference in free will. Combining considerations of olfactory interest with those of free will, then, Broca concluded, that the importance of olfaction for an organism covaries with the possession of free will.

Now, of course, it is one thing to claim that olfaction is not as important for a species; it is another to claim that olfactory ability, in the case of that same species, is poor. But that, I take it, is one way to draw attention to McGann's point. While Broca's observations may have supported, at best, the thesis that olfaction is not as important for humans, they gave rise to, according to McGann, the persistent assumption that human olfactory abilities are vastly inferior. This is evident, as McGann notes, in a contemporary of Broca: the English anatomist William Turner. Turner revised Broca's categories of *anosmatique* and *osmatique* to *anosmatic*, *microsmatic*, and *macrosmatic*—labels that instead categorized species in terms of olfactory ability. Humans are, according to Turner, *microsmatic*—not devoid of olfactory abilities, as in the case of the *anosmatic*, but in possession of very “feeble” ones. But, as McGann stresses, such a shift was not made on the basis of any sensory testing. With humans cast as *microsmatic*, then, we see a quick shift from the view that olfaction is not very important for humans to the view that it is inferior. And, according to McGann, the shift stuck. As he claims, “[t]he categorization of humans and other primates as *microsmatic* animals with an impoverished sense of smell has survived to the present day. Not only is it the default belief for nonspecialists whose work touches on the chemical senses, but it even continues to mislead olfactory scientists” (McGann 2017: 356).

As McGann argues, we can question the relation between physiology and olfactory capability with several further comparisons:

- 1 While the relative size of the human olfactory bulb is much smaller, the olfactory bulb has approximately the same number of neurons across mammalian species.
- 2 While the olfactory bulbs of mice and rats (traditionally viewed as animal “super-smellers”) have a larger relative size than that of humans, the human olfactory bulb has approximately 5,600 glomeruli compared to the approximately 1,800 and 2,400 of mice and rats, respectively.
- 3 While humans have fewer functional olfactory receptor genes (390 of 1,000) than mice (1,100 of 1,300), more glomeruli are available in the human olfactory bulb to process information from each receptor type (all things being equal, fifteen glomeruli per receptor type).
- 4 While the relative size of the human olfactory bulb is much smaller, and while humans have fewer functional olfactory receptor genes, humans have larger frontal lobes capable of interpreting signals from the olfactory bulb.

Taken together, (1)–(4) provide significant reason to question whether the relative size of the olfactory bulb across species is sufficient evidence of the truth of the interspecies comparison. But without knowing just what human olfactory abilities are compared to those of nonhuman animals—i.e. without any results of sensory testing to potentially map onto (1)–(4)—there is little reason to think that they do anything more than provide those initial considerations.

Mere physiological reasons do not provide an adequate means of assessing the interspecies comparison, then. As it turns out, however, the assumptions we naturally make about the sniffer dog map nicely onto two measures on which olfactory scientists rely when evaluating olfactory ability: olfactory sensitivity and olfactory discrimination. Olfactory sensitivity is determined by establishing the lowest concentration of a given odorant that a subject (human or otherwise) is able to detect.¹³ Olfactory discrimination, on the other hand, measures the ability to reliably tell the difference between presentations of two nonidentical odorants (often with similar chemical properties).¹⁴ Given this, we can define two versions of the interspecies comparison as follows:

The interspecies comparison_s In comparison to the olfactory sensitivity of animals, human olfactory sensitivity is inferior;

The interspecies comparison_d In comparison to the olfactory discriminatory abilities of animals, human discriminatory abilities are inferior.

In the case of the sniffer dog, we appear to make instances of both—with respect to the kinds of odors we assume to be present in the environment of the airport baggage carousel. If Broca's legacy is that, as Turner put it, human olfactory abilities are "feeble", then human sensitivity and discrimination are not just "inferior"; they are, as Lycan would put it, very poor indeed.

However, an increasing number of scientific studies now suggest that, when compared to that of animals, human olfactory abilities are much better than each of these interspecies comparisons would have them. In a recent paper, Laska (2017) compiles and summarizes the limited, but available, published data on the interspecies comparison_s and the interspecies comparison_d, across a range of mammalian species.¹⁵ As Laska notes, the studies are limited and are complicated by the difficulty in comparing olfactory ability across species; still, they indicate the need to take seriously the idea that the interspecies comparison_s and the interspecies comparison_d, if not false, are overstated.¹⁶ I will consider the data challenging each in turn.

In the case of sensitivity, Laska notes that there are seventeen nonhuman species, and 134 odorants, for which we can make any direct comparison—i.e. for which there is any degree of overlap with the results of human testing. It is important to appreciate that this only scratches the surface of the potential data relevant to the interspecies comparison_s.¹⁷ Still, given the pervasiveness of the interspecies comparison_s among scientists as well as non-specialists, the results are important. Laska presents data specific to several odorant families, as well as a summary of all of the available comparative data. For the sake of space, I will focus on the latter.¹⁸ As Laska shows, for a great majority of tested odorants, humans have lower detection thresholds than other primates (i.e. the spider monkey, squirrel monkey, and pigtail macaque) and bats (i.e. the short-tailed fruit bat, vampire bat, and common mouse-eared bat).¹⁹ Of particular interest, however, are comparisons with those animals that have the reputation for exceptional olfactory abilities—namely, dogs, pigs, and species of rodents. With the exception of the dog, humans are more sensitive to the majority of odorants for which there is comparative data. Taking all odorants tested, humans outperform mice 35–30, rats 31–10, hedgehogs 3–1, shrews 3–0, pigs 3–2, and rabbits 1–0. While the majority is more or less across cases, and the overlapping odorants significantly fewer in the case of rodents, the results are striking given preconceptions about our own abilities and the reputations of these other animals. Moreover, it is interesting to note, and, as Laska stresses, we have a higher sensitivity than dogs to five of fifteen odorants. These odorants (e.g., n-pentyl acetate and β -ionone), he tells us, are components of plant odors and, as a result, likely do not have ecological significance for dogs. Relatedly, as Laska notes, seven of the ten for which the dog is more sensitive than humans are carboxylic acids—the typical components of the odors of dog prey, such as those of fats and proteins. At this point, however, what is important to see is that, despite the claim of the interspecies comparison_s, it would seem that humans are not generally inferior with respect to sensitivity—at least with respect to the odorants and animals tested. And, in Broca's terms, we certainly do not present as "feeble." As a generalized claim about inferior human olfactory sensitivity, the interspecies comparison_s, at this point, appears to be significantly overstated. We have reason to think, then, that human olfaction is more "sensitivity-rich" than we—and scientists—have thought.

Turning now to the interspecies comparison_d, recall that olfactory discrimination measures the ability to reliably tell the difference between presentations of two nonidentical odorants

(often with similar chemical properties). It has recently been argued that humans can discriminate 1 trillion odorants (Bushdid et al. 2014). This is in stark contrast to the 10,000 odorants typically cited by textbooks and other overviews of human olfactory ability (Bushdid et al. 2014). Not surprisingly, then, compared to the discriminatory abilities of other animals, humans are also far better than the interspecies comparison_d would have us believe. As in the case of sensitivity, there is only limited overlap in the odorants for which one can make a direct comparison. As Laska tells us, human discriminatory abilities are typically tested with respect to structurally related compounds or odor mixtures of commercial use (e.g., fragrances or food); on the other hand, the discriminatory abilities of animals are typically tested with respect to odors of ecological significance (e.g., conspecific body odors, food, and prey odors). The range of animals for which there is a direct comparison is also much smaller in the case of discrimination. However, in terms of the interspecies comparison_d, interesting results still do obtain. Laska cites results for three odorant groups:

- 1 aliphatic odorants sharing the same functional group but differing on carbon chain length;
- 2 aliphatic odorants sharing the same carbon length but differing in functional group; and
- 3 enantiomers—pairs of molecules that are mirror images of one another.

For the sake of space, I reserve discussion to those species tested in all of (1)–(3): humans, squirrel monkeys, mice, and honey bees.²⁰ In the case of (1), humans had a success rate of 83 percent, with the success rate of the squirrel monkey 87 percent, the mouse 100 percent, and the honey bee 94 percent. In the case of (2), all four species had a success rate of 100 percent. In the case of (3), humans had a success rate of 42 percent, with that of the squirrel monkey 50 percent, the mouse 100 percent, and the honey bee 63 percent. In terms of the odorants tested, then, humans are comparable to the squirrel monkey and the honey bee. We are inferior to the mouse, albeit only significantly so with respect to the discrimination of enantiomers. However, in that case, all other species were significantly inferior to the mouse. As a result, on the basis of the data available, human discrimination with respect to enantiomers is not enough to sustain a generalized interspecies comparison_d. And with respect to the other odorant groups tested, our abilities are also on par with the animals tested—and at a much higher level. As a result, although the data is minimal, we have reason to be suspicious of the interspecies comparison_d, and, like the case of sensitivity above, reason to think that human olfaction is more “discrimination-rich” than has previously been thought.

Even though humans perform better than expected in both sensitivity and discrimination testing, it is important to note that ability in terms of sensitivity does not entail ability in terms of discrimination—although the converse holds. If humans are able to discriminate between two distinct odorants, then they are sensitive to those odorants at some threshold. But as the case of certain enantiomers shows (case 3 above), we might be sensitive to two given odorants without having the ability to discriminate between successive presentations of them. For a certain class of odorants and animals, then, it might be that human olfaction is rich with respect to sensitivity and inferior with respect to discrimination. That is, for a given set of odorants and animals, the interspecies comparison_s might fail to hold, while the interspecies comparison_d in fact holds.

Where are we, then? In short, in comparison to our animal friends, we are not as bad at smelling as we have thought. In many cases tested, we are not inferior with respect to sensitivity and discrimination. To be sure, our abilities might be inferior in certain other cases, but the number of cases in which we are *not* inferior—even sometimes superior—is surprising. Still, one might worry that all we learn from this minimal data is that, for a small number of cases, we perform better than we would have expected. As a result, the worry goes, we have no means of evaluating the truth of the interspecies comparisons. After all,

they are general claims, and the scope of the data is extremely narrow. This leaves open the possibility that, in general, human ability is indeed worse off.

There are (at least) two ways to respond to this worry. Each concedes the point to some degree. The first response acknowledges the minimal data as well as the claim that it fails to show the interspecies comparisons false. Still, the response continues, those cases in which our performance is superior to other animals tested (or the majority of them) presents initial reason to be *suspicious* of the generality of those comparisons. This is especially true in those cases in which human sensitivity and discriminatory abilities are superior to the reputed animal “supersmellers.” Moreover, as McGann has argued, the interspecies comparisons originated from a set of other generalizations, admitting of few exceptions—generalizations about the size of the olfactory bulb, the influence of olfaction on behavior, and the role of higher cognitive states on the former. To be sure, as McGann has argued, they are hasty generalizations. But if the legacy of these generalizations is one of conferring little, or no, exception on the interspecies comparisons, as we have unpacked them, then any data to the contrary serves to significantly chip away at the plausibility of those comparisons.

The second response to the worry is to urge that, despite the limitations of the data available in assessing the generality of the interspecies comparisons, we can view it as an opportunity to take a closer look at that data. When we do, we draw attention to the variety of ways that we can evaluate, and appreciate, human olfactory ability. Stated in terms of informational richness, we see that there are further, more specific, ways to conceive of the richness of human olfaction. I turn now to that discussion—although, like Lycan previously, I intend my remarks to be merely “preliminary”.

Informational richness: further variations

The first thing to note is that discussion of sensitivity and discrimination for the human case highlights the fact that there are two further, intramodal, ways of making the *intraspecies* comparison. For example, consider sensitivity. Organisms are more or less sensitive depending on the odorant under consideration. Given the available data about human sensitivity and discrimination, we can put forth the following, intramodal, *intraspecies* comparisons:

The olfaction-specific intraspecies comparison_s In comparison to human olfactory sensitivity to n-pentyl acetate, human olfactory sensitivity to n-propanoic acid is inferior; and

The olfaction-specific intraspecies comparison_d In comparison to human ability to discriminate odorant pairs of n-carboxylic acids, human ability to discriminate odorant pairs of n-aldehydes is inferior.

Each of these olfaction-specific intraspecies comparisons allows us to conceive of the richness of human olfaction as it pertains to our sensitivity to, and discrimination of, particular odorants and odorant groups—as opposed to measures of those abilities overall. As scientists typically test odorants belonging to certain odorant groups, constructing comparisons of this form provides a scale of informational richness for humans, with respect to sensitivity and discrimination, relativized to those odorant groups. If those odorant families, in turn, are thought to be of some *significance* to humans (e.g., behavioral and/or ecological), then mapping informational richness in this way provides data for evaluating claims of odorant significance. And many human studies are indeed conducted with the aim of understanding the significance of olfactory cues.

I will return to the issue of behavioral and ecological significance at the end of this section. At this point, it is important to note that the interspecies comparisons also admit of further, specific versions. If we are to take their claims of human inferiority at face value, and considering those odorants for which there is direct comparison between humans and animals,

we can formulate an interspecies comparison_s and comparison_d for any of the individual odorants for which animals and humans have each been tested. For example, we are able to formulate the following interspecies comparisons:

*The interspecies comparison_s** In comparison to the olfactory sensitivity to n-carboxylic acids of animals (tested), humans are inferior; and

*The interspecies comparison_d** In comparison to the ability of animals (tested) to discriminate between the isomers R-carvone and S-carvone, humans lack this discriminatory ability.

Of course, as the available data shows, each of these comparisons is false—at least with respect to our abilities compared to the group of animals that have been tested. Humans have a higher sensitivity to n-carboxylic acids than the majority of other animals tested; along with all other animals tested, humans can discriminate between the isomers R-carvone and S-carvone. As in the case of the additional version of the intraspecies comparison above, we arrive at an additional scale of informational richness—again, defined with respect to sensitivity and discrimination, relativized to an odorant or odorant group but covering both human and animal ability. And also, as in the case of the additional versions of the intraspecies comparison above, opportunities for evaluating claims of significance apply.

Now, my parenthetical qualifiers in the above comparisons are meant to earmark the fact that, of the animals tested so far, those animals represent an extremely small sample of existing animals (and are almost all mammals). What they also mark off, however, is that any specific version of the interspecies comparison_s and comparison_d, put forth with respect to odorant, or odorant group, admits of even further versions depending on the animals under consideration. In the case of sensitivity, although we only have seventeen types of mammal with which we can make a direct comparison, those seventeen admit of further division into subgroups of various mammalian orders —e.g., *Primate*, *Rodentia*, *Carnivora*, and *Chiroptera*. Given the available data, then, we can formulate versions of the interspecies comparison_s* above in terms of *Primate*, *Rodentia*, *Chiroptera*, and *Carnivora*, etc.—although, to stress again, evaluation of those comparisons would remain preliminary given the small sample size. The even more minimal sample of animals in the discrimination case limits our ability to formulate many further versions of the interspecies comparison_d*. At present, we can formulate further comparisons_d* in terms of six individual species as well as several mammalian orders (i.e. *Carnivora*, *Primate*, *Proboscidea*, and *Rodentia*). Like the case of the interspecies comparison_s*, evaluation of the comparisons involving mammalian order would remain particularly preliminary. Still, as above, what this draws attention to is the various scales of informational richness to which we can help ourselves and the opportunities for further analysis to which we can put them.

Earlier, in my discussion of McGann's Broca, I claimed that it is one thing to think that olfaction is unimportant for humans; it is another to think that our abilities are poor. And, in examining our abilities of sensitivity and discrimination further, I promised to return to issues of the ecological and behavioral significance of olfactory cues. Given that our abilities have turned out to be better than we initially thought, and those abilities direct attention to issues of behavioral and ecological significance, we must now ask: in terms of the ecological and behavioral significance of the information it delivers, is olfaction more important for us than we might have thought?²¹ To ask this question is to ask whether the following, Broca-inspired, comparison is true:

The interspecies comparison_i In comparison to animal olfaction, human olfaction is less important for the organism.

Now, this comparison certainly seems to be true. Animals rely on their noses in many cases where we use our eyes. But we must distinguish between olfaction's not being as important to us and our lacking certain capacities that animals have to modify their behavior on its basis. Given this, we can define a final version of the interspecies comparison as follows:

The interspecies comparison_b, In comparison to animals, humans have less capacity to modify behavior on the basis of olfactory cues.

As Laska (2011 and 2017) notes, various behavioral studies seriously challenge this comparison. As he notes, in terms of the type of behavioral role that olfaction plays in other animals (e.g., food selection, spatial orientation, and social communication), olfaction plays a behavioral role for humans in many of the same ways. For example, when exposed to volatile chemicals, humans exhibit avoidance behavior such as head-turning, eye closure, sneezing, and coughing (Laska 2017). Studies show that humans are able to follow odor scent trails (Porter et al. 2006), and that, in terms of food selection, it seems obvious that olfaction plays a significant role in determining whether food sources pose any nutritional risk. (Just think of what you do when you question if food has gone off. You smell it.) In response to the odors of their mothers' breast and breast milk, human babies exhibit head-turning and mouth-gaping behavior (Doucet et al. 2007). Similarly, human mothers are able to discriminate clothes worn by their own babies from clothes worn by those of other babies (Kaitz et al. 1987; Porter 1998; Porter et al. 1983). Finally, studies suggest that human males are able to discriminate between the body odors of females at different stages of their menstrual cycle, claiming preference for the body odor of the ovulation stage (Havlíček et al. 2006; Kuukasjärvi et al. 2004; Singh and Bronstad 2001). And this is only a selection of the behaviors that Laska cites.²² Even if it turns out that humans still have less capacity than other animals to modify behavior in light of olfactory cues, what these examples show us is that "less capacity" is, in fact, more of one than we might have thought. And these results, while they do not show that olfaction is equally important for humans—i.e. they do not show that the interspecies comparison_i is false—it is still much more important than we might have thought.

Conclusion

I want to conclude by drawing attention to something that I have not done in this paper. I have not attempted to provide an exhaustive account of the notions of informational richness as they apply to the olfactory case. Rather, my aim in this paper has been to introduce several such notions as they apply to two recent debates about olfactory ability—one in philosophy and the other in the sciences. In line with the theme of this book, I have provided a "recent history" of the issues, relating to the notion of informational richness, that the comparisons driving those debates introduce. But clearly there are other issues with which such a notion can be explored. Drawing on empirical research, several philosophers have already discussed olfactory quality space and, in doing so, have begun to grapple with extremely difficult questions about the "property-richness" of human olfactory experience.²³ And, with perfumery and wine-tasting, for example, there is obvious traction for a notion of "aesthetic richness." I leave these as food for thought—as future topics of recent history.

Notes

- 1 To be sure, several discussions of olfaction appeared in the philosophical literature previous to this point. See, e.g., Lycan (1996), Perkins (1983), and Reid (2000). However, these discussions stand out

- as exceptions to the body of work largely on visual perception and do not represent any significant trend in philosophical enterprise.
- 2 According to Lycan, the path it did take was one that began with the commonsense idea that vision is somehow “strongly direct”—i.e. lacking any inner representation. Enter the argument from illusion (or considerations employed by that argument) and the debate about direct versus indirect perception got off its feet. The introduction of intentional theories of experience provided a way to maintain that vision is “weakly direct,” lacking the indirectness imposed by sense data but nonetheless involving representation. If we had started with olfaction, Lycan claims, a “strong direct realism” would not have been the initial, commonsense view. That olfaction involves some kind of inner representation would have been natural to assume—although he rules out sense data as being those representations. The contemporary debate about olfaction has not taken up issues of the nature of the perceptual relation with those of directness included. As I will show, it has focused instead on what Lycan takes to support a directness claim—namely, informational richness. For this reason, I will not discuss directness in this chapter. I do, however, urge the reader to look at how Lycan takes issues of directness, and others related to it, to be informed by considerations of informational richness.
 - 3 Lycan considers a total of ten points of similarity and difference. In what follows, I will combine discussion of the additional five that I take to inform his notion of informational richness. They occur under the headings: (1) phenomenological location; (2) degree of presumed resemblance or at least correspondence between a sensory field and the reality it presents; (3) credentials of sense impressions as representations; (4) variety and kinds of besetting illusions; and (5) credentials as presenting a phenomenological individual.
 - 4 It must be noted that Lycan’s resemblance claim for vision sounds like a transparency claim. Indeed, Lycan claims that resemblance “is very strong for vision, so strong that the ‘*see right through*’ phenomenon is the normal case, and the resemblance or correspondence is (falsely) felt as identity” (2000: 279, my emphasis). However, Lycan’s talk of resemblance between the visual field and the world indicates that we can still turn our attention to visual experience, if only in the grips of philosophical theorizing about it.
 - 5 One might worry that my characterization of the olfactory properties presented in this experience is overly simplistic. After all, the emanations that the rose and the croissant each give off are chemically complex, and it is those emanations that ultimately trigger the olfactory receptors. However, scientists commonly hold that olfactory experience is largely synthetic—that the various properties of a chemical stimulus produce an irreducible experience (Stevenson and Wilson 2007; Wilson and Stevenson 2006). The idea is that, despite the complexity of the stimulus, we are presented in experience with simply “rose-ness” and “croissant-ness.” I employ this idea in my example, and in reconstructing Lycan’s observations.
 - 6 Indeed, it would seem ubiquitous to all of the sensory modalities.
 - 7 As before, one might hold that olfactory experience is more “property-rich” than my examples indicate and for reasons that bypass considerations of synthetic experience (see endnote 5). It is natural to think that at least some tracking behavior is driven by what the olfactory cue *means* to us. Given this, one might hold that olfactory experience presents Gibsonian affordance properties such as the properties of being edible or inedible, or of being mate or stranger (Gibson 1966: chapter 8). Remaining neutral whether any such properties are presented in olfactory experience, I will discuss the behavioral and ecological significance of olfactory cues in the last section of the chapter—albeit only in a preliminary way. For now I take it that, even if we supposed that olfactory experience represented such properties, the point stands: we are generally able to sample the atmosphere, through space and time, in order to determine where olfactory properties are located, and where they are not.
 - 8 I use “odor” to refer to these emanations. I do not, as another common use has it, use “odor” to refer to an olfactory property. However, as the reader will see, other quoted authors adopt additional uses to these two —i.e. Lycan 2000 (see p. 325) and Mizrahi 2014 (see p. 328). To avoid cluttering discussion, I will not make note of these other uses; their meaning in context is, I take it, clear. I simply ask the reader to expect them.
 - 9 Batty (2010b: 111; 2010c: 18, 2011: 171) raises similar considerations about breathing. But, as Richardson notes, Batty’s observations do not distinguish between the view that “being directed at the world” involves olfactory phenomenology itself or that it involves a kind of inference based on sensory phenomenology (olfactory or tactual). Compared to Richardson, then, Batty’s considerations are only preliminary.
 - 10 Batty (2010a: 514, 2010b: n. 23, 2010c: n. 12, 2011: 170, 2014a: 10) draws attention to the fact that hammerhead sharks have a directional sense of smell. In each case, however, she does so with the ultimate aim of understanding, and challenging, the *intraspecies* comparison.

- 11 In what follows I will drop “nonhuman” and simply speak of animal olfaction. Given our inability to talk about animal olfactory experience directly, I will also generally speak of human and animal *olfactory abilities*, as opposed to experience.
- 12 For anyone concerned, I escaped unscathed by any penalty.
- 13 In what follows, I will adopt Laska’s convention of using “odorant” to refer to the olfactory stimulus in the experimental setting and as it is chemically defined. He reserves “odor” for the complex mixtures that we and other animals encounter in our respective environments, and that we typically categorize, with more or less generality, with respect to their sources—e.g., rose odor, food odors, and odors of prey. This use of “odor” is consistent with my own use in the preceding section (see note 8). Of course there is overlap between the referents of each; for the purposes of this paper, however, this need not worry us.
- 14 For example, in an effort to understand the relationship between molecular structure and perceived olfactory quality, olfactory scientists have been long interested in enantiomers—pairs of molecules that are mirror images of one another. I turn to a discussion of enantiomers below.
- 15 As we will see below, Laska (2017) also considers one species of insect. In what follows, all references to the available animal data are to Laska (2017). To keep references to a minimum, I refrain from citing the papers from which Laska has drawn, and compiled, his data. I leave it as understood that those papers are the source of that data and direct the reader to Laska (2017) for any citations.
- 16 See Laska (2017) for a discussion of the challenges of comparing the olfactory abilities of human and nonhuman animals.
- 17 None of the 134 odors that Laska provides specific results for is one that has been tested for all seventeen of these species. To get a further sense of the limited data available at this time, Laska asks us to appreciate the fact that there are approximately 5,500 species of mammals. Given that there are only seventeen species for which a direct comparison is available, this represents only .003 percent of non-human animals. Similarly, while human sensitivity has been tested for approximately 3,300 odorants, the greatest number any other species has been tested for is eighty-one (the spider monkey). I direct the reader to Laska (2017) for further details on the data available.
- 18 Those odorant families for which Laska presents detailed data are aliphatic n-carboxylic acids, aliphatic alcohols, and aliphatic acetic esters. Aliphatic n-carboxylic acids occur widely and include the amino acids (which make up protein) and acetic acid (a major component of vinegar that occurs in metabolism). Aliphatic 1-alcohols, including ethanol, are often used in industry (e.g., as solvents, fuels, and additives). Aliphatic acetic esters are a family of fruit associated odorants.
- 19 Taking all odorants, humans outperform spider monkeys 57–18, squirrel monkeys 50–11, pigtail macaques 54–6, short-tailed fruit bats 17–1, vampire bats 14–1, and common mouse-eared bats 13–6 (Laska 2017: 681, fig. 32.9).
- 20 For the results of other species, I invite the reader to consult Tables 32.2–32.4 in Laska (2017).
- 21 Of course, there are other notions of importance available for a given sensory modality. For example, in the conclusion of this chapter, I propose a notion of “aesthetic richness” in accordance with which we might explore a notion of “aesthetic importance.”
- 22 I direct the reader to Laska’s papers (2011 and 2017) for more detail on those behaviors and citations for the relevant empirical studies.
- 23 See, for example, Clark (1993) and Young et al. (2014).

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19

MOLYNEUX, NEUROPLASTICITY, AND TECHNOLOGIES OF SENSORY SUBSTITUTION

Mark Paterson

The phenomenon of sensory substitution is not new. Blind subjects decode tactile signs or mechanically augmented learning materials, such as printed Braille, refreshable Braille displays, or tactile maps, through their fingertips. Tactile–visual sensory substitution (TVSS) is a functional equivalence, if not an absolute analogue, between vision and touch for the purposes of textual comprehension and wayfinding. However, such sensory-substitution technologies have spurred some philosophers to make large claims about the underlying neurophysiological architecture of the brain. In particular, the kinds of historically recognized functional analogues between vision and touch, when facilitated by recent generations of sensory-substitution device (SSD) technology, are often explained in terms of brain plasticity, as adaptation to these technologies requires fast perceptual learning and, over the long term, substantial cortical remapping. “Sensory substitution is [...] only possible because of brain plasticity,” assert the neuroscientists Bach-y-Rita and Kercel (2003: 541). The significance of TVSS specifically to highlight possibilities of neurological plasticity has captured the public’s imagination to some degree, featuring in the *New Yorker* (Twilley 2017) and in books of popular neuroscience by Doidge (*The Brain That Changes Itself*, 2007; *The Brain’s Way of Healing*, 2015). Philosophical interest started relatively early and has persisted, including Hurley and Noë (2003), Noë (2004, 2009), Clark (2007), Auvray and Myin (2009), Chirimuuta and Paterson (2014), Kiverstein et al. (2015), and Nanay (2017). Although it is tempting to employ the term “sensory substitution” for more routine transfer between modalities, or even for analogous use such as “seeing with the hands” (see Paterson 2016), in fact it has a rather specific application. In neuroscientific literature, Lenay et al. explain that sensory substitution “denotes the ability of the central nervous system to integrate devices of this sort, and to constitute through learning a new ‘mode’ of perception” (2003: 276). Irrespective of claims about neurological plasticity, then, integrating technological devices into our perceptual schemas in this way does not entail a straightforward analogue between the senses. Instead, philosophical claims about what SSDs mean for perception form a wide spectrum of positions. Generally, they either augment or extend existing modalities (e.g., Auvray and Myin 2009), produce some form of functional or behavioral equivalence (e.g., Morgan 1977; O’Regan and Noë 2001), or according to a recent argument, produce neither visual nor tactile perception per se but rather “multimodal sensory imagery” (Nanay 2017; see Table 19.1).

Table 19.1 Some arguments in the literature about SSD perception.

		Does SSD constitute a full sensory substitution (replacement)?	
		Yes	No
Is SSD a new perceptory type?	Yes	Lenay et al. 2003: new “mode” of perception Clark 2003, Auvray and Myin 2009: Extension	Noë 2004: Proto-perception
	No	Bach-y-Rita et al. 1969: seeing through the skin O’Regan and Noë 2001: sensorimotor equivalence Morgan 1977: behavioral equivalence	Nanay 2017: Multimodal Imagery

Note: With thanks to Brian Glenney, based on the helpful classification by Auvray and Myin (2009). This is intended to be an indicative guide to the types of philosophical claims and is far from exhaustive.

To help contextualize these questions, we turn to a debate in the history of the philosophy of perception known as the Molyneux problem or Molyneux question (See Glenney, this volume, p. 000; Morgan 1977; Evans 1985; Degenaar 1996; Paterson 2016 for further discussion). The correspondence initiated by William Molyneux to John Locke in 1688, summarized and discussed in the second edition of Locke’s *An Essay Concerning Human Understanding* in 1694, and subsequently addressed by a number of philosophers such as Berkeley, Reid, Voltaire, Buffon, and (posthumously) Leibniz concerns the possibility of cross-modal transfer between touch and vision in a congenitally blind subject. Briefly, the question can be stated: “If a man, blind from birth, suddenly gained vision, could he tell a sphere from a cube by sight alone on the basis of a lifetime of solely tactile experience?” (Riskin 2002: 23). The significance of this question for both Locke and Berkeley lies in the way that it subjects prior assumptions of innate or preexisting ideas to empirical criteria. Berkeley indirectly argues for the empiricist claim via heterogeneity of the senses, and Locke via perceptual learning. One of Berkeley’s stated tasks in *An Essay Towards a New Theory of Vision*, for example, was “to consider the difference there is betwixt the ideas of sight and touch, and whether there be any idea common to both senses” (1709: §1). Recent decades, however, have cast a different light on the problem. Gareth Evans (1985), for example, presents his summary and solution of the Molyneux problem as a lesson in dealing with the senses in more fine-grained bodily terms, considering the integration of vision with other bodily perceptions and sensations including audition and kinesthesia. Answering “yes” to the Molyneux question, that is, that shapes can be recognized by the newly sighted subject visually without resorting to touching them, would entail an already existing perceptual capacity for cross-modal transfer, a claim supported by recent postoperative evidence (e.g., Held et al. 2011; Chen et al. 2016), which I pursue in the section “Molyneux in the Age of Neuroplasticity” and solidify in the final section, “Neuroplasticity in Sensory Substitution.” Central to this chapter, therefore, is the interrogation of the role of neuroplasticity in preexisting capacities for cross-modal transfer that SSDs, and especially TVSS, rely upon. However, at this stage it is important to recognize that the historical formulation of the Molyneux question specifically stipulates that the postoperative subject determine the shape of the object by sight (see, e.g., Glenney n.d.). The virtue of introducing SSDs into the equation therefore lies either (1) in their capacity to produce a

functional equivalence such that it is a robust enough form of “seeing,” so that it is an extension of, or defers to, the organizing modality of vision rather than any other; or (2) in their offering the capacity of transfer between sensory modalities such that the shapes of objects can be determined by means of sensory analogue not so strictly equivalent to seeing but perceived or presented through other means. The first offers a high bar for the technology to clear whereas the second not only offers a lower bar but, strictly speaking, fails to fulfill the requirements for answering the Molyneux question as originally stated and, furthermore, questions whether experiences with the technology are actually perceptory in nature or simply a form of “multi-modal mental imagery” (Nanay 2017). Therefore, following the earliest publications on the technology of sensory substitution that explicitly references the Molyneux question (Morgan 1977; Bach-y-Rita 1997), I use the Molyneux question as a starting point to consider the wider implications of sensory substitution, and particularly the relationship between neuroplasticity and cross-modal transfer. This departs from the original question Molyneux poses to Locke with regard to the relationship between touch and vision, and instead seeks to generalize this to other modalities. Arguably, therefore, the discussion of SSDs potentially opens up questions of neuroplasticity beyond the Molyneux question and offers resources to investigate a more generalized theory of the senses, i.e. a “Meta-Molyneux Question” or MMQ (see Chirimuuta and Paterson 2014 for a more philosophically developed version of this argument).

Sensory-substitution systems: a kind of “seeing”?

Direct stimulation of sensory nerves through artificial means occurs in retinal prostheses (“bionic eyes”) or in cochlear implants (“bionic ears”). Sensory-substitution technologies work differently by transforming the stimuli characteristic of one sensory modality (e.g., vision) into stimuli of another sensory modality (e.g., touch). The system achieves this by means of an electronic sensor converting ambient energy or information such as light or sound through an electronic coupling system that coordinates activation of a stimulator array (Lenay et al. 2003: 276). Generically, these are either termed “sensory-substitution systems” (SSSs, in Lenay et al. 2003; Noë 2009), or “sensory-substitution devices” (SSDs, in, e.g., Deroy and Auvray 2014). This chapter concentrates principally on tactile–visual sensory substitution (TVSS) systems, in particular one known as the BrainPort.

From abstruse and innovative experiments in the 1960s until his death in 2006, the pioneer of TVSS was inarguably the neuroscientist Paul Bach-y-Rita. In his landmark *Brain Mechanisms in Sensory Substitution* he neatly summarizes the aims of a TVSS system: “In a tactile sensory substitution approach, a sensory system previously virtually restricted to contact information must mediate three-dimensional spatial information and integrate spatial cues originating at a distance” (1972: 66).

A brief historical note on the engineering of the devices underlines the fact that, despite inevitable shifts in technology and miniaturization, the underlying qualitative aspects for the experimental subjects remained remarkably similar. Bach-y-Rita always intended such technologies to be active ongoing perceptual experiments rather than a simple restorative shortcut. The first devices in his lab were largely mechanical, such as the hulking research device built in 1968 around a dental chair with a heavy base that translated a tripod-based low-resolution video feed into patterns of pressure on the skin via a series of metal pins. Because of the physical size of the tactile pin array, a 20×20 grid of solenoid stimulators had to be built into the chair, and the research subject manipulated a large, zoomable television camera on a tripod in order to scan objects on a table in front (Bach-y-Rita et al. 1969: 963). Training with blind research subjects concentrated initially on solid geometrical shapes and easily discernible lines, and even in this

primitive incarnation, given sufficient numbers of hours in training, there was the potential to understand the visual rules of perspective and occlusion, for “learning to see”: “With repeated presentations [of objects through the device], the latency or time-to-recognition of these objects falls markedly; in the process, the students discover visual concepts such as perspective, shadows, shape distortion as a function of viewpoint, and apparent change in size as a function of distance” (Bach-y-Rita et al. 1969: 963).

Subsequent versions became more portable, and in 1971 a prototype of the so-called Smith–Kettlewell Portable Electrical Stimulation System was demonstrated with blind subjects using a head-mounted camera with a tactile array on the abdomen. More recently, a tongue-based variant colloquially known as the “lollipop” has been tested experimentally. Developed initially by Bach-y-Rita and his company Wicab Inc. from 1998, the lollipop is a highly portable tongue display unit (TDU) marketed as the BrainPort V100. The trademark and use of the term “Brainport” might be thought significant, heralding the promise of a series of technologies that bypass sensory limitations. A quote from Wicab’s online promotional video encourages this interpretation, claiming “your brain is what really sees, not your eyes” (Wicab.com 2011), an almost exact paraphrase of the Cartesian sentiment from *Dioptrique*, “it is the mind which sees, not the eye; and it can see immediately only through the intervention of the brain” (Descartes 1965: 108). A small video camera mounted in the frames of dark spectacles streams video footage into a small belt-mounted computer that converts the signal into a flexible 25×25 electrode array. Like a small retainer, the TDU can be freely inserted or removed from the mouth. When placed directly upon the tongue, patterns of electrical stimulation through the array feel like champagne bubbles popping with different intensities in different places, changing according to updates in the video stream. This system outperforms earlier versions of TVSS because the tongue is smaller and more sensitive than the back or abdomen, and saliva in the mouth enhances the electrolytic environment, increasing conductivity (Bach-y-Rita et al. 1998). The technology has proved successful for seeing shapes, letters, reading words, and enhancing mobility and spatial awareness without vision. Footage of blind subjects playing games of noughts and crosses, throwing darts at dartboards, and navigating cluttered courses features in TV news and on the BrainPort website and confirm what earlier trials in the laboratory had found: that the specifications of resolution and refresh rate for the tactile array are “good enough” to make the device useful in practical tasks (e.g., Sampaio et al. 2001, Ptito et al. 2005).

The technology has already attracted much philosophical interest. Heil (1983), Hurley and Noë (2003), and Noë (2004) all describe TVSS as endowing a kind of seeing. In fact, blindness and the TVSS feature in Noë’s *Action in Perception* (2004) in order to bolster his overall thesis of an enactive theory of perception. Nevertheless, along the way he also supports the position taken here and by Millar, that “we cannot individuate perceptual modalities by physical or physiological criteria alone” and that TVSS demonstrates exactly this because “TVSS is a mode of quasi-seeing without any involvement of eyes or visual cortex” (Noë 2004: 111). Morgan (1977) wrote a largely historical overview of the Molyneux question, but his final chapter on technologies for the blind included an account of an early incarnation of Bach-y-Rita’s TVSS experiments. A positive answer to the question was implied, that touching through a TVSS was comparable in significant ways to seeing. One of the reasons for claiming that TVSS enables a kind of seeing are the functional equivalences between different modalities, effectively illustrated in the “looming” effect of a camera zoom. Bach-y-Rita himself had noticed during trials that if the experimenter makes the TVSS camera zoom into an object, the sudden felt expansion of the object through stimulation on the tongue causes subjects to flinch, just as if the object were

hurtling toward them (1972: 98). This zoom-like effect relies on a characteristically visual stimulus, what Gibson (1979) terms the expansion of optic flow. In this case, TVSS enables the modality of touch to respond to spatial cues normally only available to vision, but whether these particular functional equivalences should rightly be described as “seeing” or “sight” is debatable.

Furthermore, the subject need not be blind or even vision-impaired for there to be vision-like perceptions through the tongue, or for the zooming effect to work with TVSS (Bach-y-Rita 1972). Confirmed by my own experience with the TDU during a visit to University of Pittsburgh Medical Center in 2013 (see Paterson 2016 for an account), both blind and sighted require a period of acclimatization to the device. Switching the machinery on does not immediately endow the subject with any new perceptual capacity. Instead, through a steady learning process, the TVSS system becomes a useful means of performing certain perceptual operations (Bach-y-Rita 1972, Sampaio et al. 2001; Ptito et al. 2005, Bubic et al. 2010). The learning rates for different tasks vary. While target detection and spatial orientation are almost immediate, discrimination of horizontal and vertical lines and direction of movement takes practice. The fast recognition of ordinary objects usually takes ten hours of learning, according to Lenay et al. (2003: 279). A crucial precondition for learning to take place is that the subject must be allowed to manipulate the camera and actively engage with the sequence of image-capturing. A series of static forms on the tactile matrix does not facilitate learning, and feedback on discriminatory performance is essential (Sampaio 1995). Experientially, tactile stimulation that conveys information about distal objects is readily distinguished from local irritations produced by the electrode matrix on the skin. Furthermore, TVSS stimulation is not felt as if “on” the skin, as a kind of bodily sensation, but comes to be “projected” into a reference frame or field external to the immediate point of vibrotactile contact with the device. What might seem surprising is that this effect does not require a particularly sophisticated system or a dense tactile array, and was notable even in the earliest incarnation of Bach-y-Rita’s TVSS in the dental chair:

Our subjects spontaneously report the external localization of stimuli, in that sensory information seems to come from in front of the camera, rather than from the vibrotactors on their back. Thus, after sufficient experience, the use of the vision substitution system seems to become an extension of the sensory apparatus.

(Bach-y-Rita et al. 1969: 964)

In other words, given sufficient acclimatization with the TVSS equipment, the tactile-cutaneous field comes to be interpreted as a visuo-spatial field.

Molyneux in the age of neuroplasticity

What happens during the periods of acclimatization with the sensory-substitution equipment? More precisely, what is happening to the brain during this learning process? The learning required for TVSS use is understood to be correlated with structural and physiological changes in the brain, including the visual cortex. In one neuroimaging study, Ptito, Moesgaard and Gjedde (2005) trained eleven early blind subjects to locate an object using the 12 × 12 electrode “lollipop” or TDU. After one hour of practice, the blind participants showed significantly increased activity in the visual cortex when performing the task, activity not found in the PET scans prior to training. In other words, learning to use TVSS involved the recruitment of new sensory areas of the brain that were not activated initially, hence evidence of neuroplasticity is rather pronounced and surprisingly rapid in acclimatization tasks.

It is interesting to compare this study with the long-standing observation that Braille reading is technically difficult for sighted subjects to learn and involves the recruitment of the visual cortex, even in blindfolded sighted participants undergoing prolonged visual deprivation (Kauffman et al. 2002; Pascual-Leone et al. 2008). Braille is an earlier and more robust technology than TVSS, one that also involves a learning process through which touch is involved in a new kind of spatial discrimination and thereby involves the temporary reorganization of the visual cortex. One unpredictable finding, however, was how fast the plasticity could be reversed. For the blindfolded (sighted) subjects, this cortical reorganization typically disappears within twenty-four hours of the blindfolds being removed. But there is one more remarkable thing from their research which has a rather profound implication for blind and sighted subjects alike, through which we might reconsider the Molyneux question, and which prompts us to reconsider what a modality (as opposed to a sense) consists in. Their results suggest that the tactile input to the visual cortex already exists in the sighted but is ordinarily “masked” by visual input and activity, since clearly there was insufficient time in the experiment for entirely new neural pathways to grow. The rapidity of the cortical reorganization, in other words, highlights a set of preexisting coordinations between parts of the visual and somatosensory (tactile) cortices, so that submodalities of touch and of vision effect functional equivalences. Recent reports of cataract removal which explicitly reference the Molyneux question seem to support this conclusion. For instance, Chen and his team state, “The two senses are prearranged so that they soon calibrate with each other after a brief period of visual-motor experience” (Chen et al. 2016: 1072). Likewise, renowned neuroscientist Richard Held included surgeons among his team to readdress the Molyneux question: “The rapidity of acquisition suggests that the neuronal substrates responsible for cross-modal interaction might already be in place before they become behaviorally manifest” (Held et al. 2011: 552). In other words, although there may not be radically or symmetrically plastic cross-modality between all senses, in the wake of the Molyneux question we are becoming aware of some underlying neurophysiological clues as to why. Chen et al.’s research disavows the idea of cortical localization in sensory areas in favor of wider functionally driven recruitment of sensory input for the purposes of, e.g., spatial perception. If this cortical capacity for cross-modal recruitment is present, to what extent does this involve the forms of neuroplasticity we have discussed so far?

Previous philosophical accounts of the senses have assumed that the presence in perception of an external spatial field is a component of our usual bodily awareness and is a stable characteristic of sensory modalities (e.g., Révész 1937, 1950; Martin 1992). If the spatial field is associated especially with vision, the background awareness of our embodiment is associated more with touch (e.g., Martin 1992; O’Shaughnessy 1989; Paterson 2007). From this, Michael Martin (1992) argues against the idea of a general theory of perception. Following Berkeley to a large extent, and consciously echoing the differentiation between a cube and a sphere that the Molyneux subject must determine, Martin notes that the geometric curvature of a rubber ball is seen in the context of a visual field but felt as a type of impression on the skin, an impingement upon the bodily contour. His assumption is that these contrasting characteristics of the modalities, what is seen and what is felt, are fixed. But here is where technologies of sensory substitution can advance the debate.

What if, under certain circumstances, the experience of touch can be released from its entanglement with bodily sensation, to become more distal and vision-like? In other words, the changeability of sensory systems, and the variety of perceptions they bring about, means there is no neat or fixed separation between visual and tactile spatial perception? Recent findings concerning the plasticity of neural systems underlying sensory performance, including those using sensory-substitution systems, reassert this possibility. Upon experiencing optically driven

touch stimulation in TVSS systems, that is, the conversion of visual information into patterns of vibrotactile input on the skin, subjects develop a more embodied or haptic awareness attuned to spatial navigation and orientation tasks. Initially this might suggest that sensory systems are endlessly reconfigurable, and therefore that the Molyneux question about vision and touch could be extended to other senses (see Deroy and Auvray 2013 for a development of this idea). In other words, this opens up the possibility of cross-modal transfer of information between any two sense modalities, as evidenced by the fact that blind subjects are able to achieve complex spatial tasks through augmented video feeds and vibrotactile feedback. Yet, although there may be evidence of plasticity in terms of sensory pathways, as will become increasingly evident, we cannot assume such pathways are equally reconfigurable in every direction. Furthermore, the inherent similarity of certain visual and haptic spatial functions makes these more “substitutable” than other modalities, as will be discussed below. Experimental evidence will show that touch and vision have a privileged relation, which is eminently exploited, and exploitable, in TVSS systems.

Given that certain channels between modalities are privileged, especially between vision and touch, we must ask to what extent other modalities can be involved in substitutions without making invalid generalization. One factor that motivates this question is the growing appreciation of the importance of cross-modal spatial attention (see Spence and Driver 2004) and cross-modal sensations. To complicate this further, such sensations may currently lie outside modality-specific theories, that is, outside of the Aristotelian model of the five distinct or extant senses (e.g., Kemp and Fletcher 1993; Spelke 1998; Streri and Gentaz 2004, Ganson and Ganson 2010). These considerations would be complementary to the ongoing debate over how the sense modalities should be categorized and defined (e.g., Keeley 2002, 2009; Noë 2004). Much empirical work suggests that each modality is more complex and disunified than our everyday embodied experience suggests.

In an oft-cited paper on active touch, for example, the ecological psychologist James J. Gibson (1962) describes the key role of purposeful movement, when the sense of touch is used for gathering information about the shape of objects (confirmed by Chen et al.’s 2016 experimental results). When subjects were engaged in such “active touch” tasks they were unable to report the flux of sensations on the skin, only the rigid edges of the object felt. Gibson states: “One perceives the object-form but not the skin-form. The latter is, in fact, continually changing as the fingers move in various ways. It is almost completely unreportable, whereas the pattern of physical corners and edges seems to emerge in experience” (1962: 482). In active touch, *contra* Martin, there is no body-field as such, and the perception lands firmly on the external object being perceived. For example, when changing gear in a car with manual transmission, we direct our attention less to the surface texture of the gearstick and more on the pattern of muscular movement necessary to achieve the requisite gear change. Gibson contrasts reports of active touch with his subjects’ observations of passive touch, cases where the experimenter induces the same tactile sensations as would be caused by the subject’s manual exploration. In those cases, the cutaneous events become distinct to the subject as something happening to the body surface. Helpfully for our discussion of TVSS, Gibson concludes that there is a mode of touching that is vision-like. Seemingly in direct answer to those like Géza Révész (e.g., 1937; 1950), Marius von Senden (1960), and Michael Martin (1992) who assume the separation and fixity of the modalities, Gibson observes, “Vision and touch have nothing in common *only when they are conceived as channels for pure and meaningless sensory data*. When they are conceived instead as channels for information-pickup, having active and exploratory sense organs, they have much in common” (1962: 490; original emphasis).

This line of thought will be explored in the following section. What Gibson acknowledges is the possibility of an inherent flexibility in the way that sensory modalities represent external objects and bodily occurrences. This flexibility is what is exploited in technologies of sensory substitution, as we now detail.

Neuroplasticity in sensory substitution

Sensory-substitution technologies require fast perceptual learning, a period of acclimatization for the user, and, over the long term, substantial cortical remapping. The findings about the reordering of cortical activity are unsurprising. Remember, as Bach-y-Rita and Kercel declared: “Sensory substitution is [...] only possible because of brain plasticity” (2003: 541). The fact that the brain is “plastic” throughout its life span, rather than fixed after a critical period as Weisel and Hubel had assumed, is increasingly recognized to be key to understanding many of its functions, not only in memory and learning but also for perceptual and cognitive processes, and of course recovery after injury. Bach-y-Rita was one of the earliest proponents of this now fashionable idea, based on his observations in neurorehabilitative medicine, sparked by an incapacitating stroke that his father experienced but eventually recovered from (Doidge 2007: 20). Profound changes in the organization of sensory systems occur not only after contact with substitution devices but also as a result of sensory loss or temporary sensory deprivation (e.g., Büchel et al. 1998, Kauffman et al. 2002, Pascual-Leone et al. 2008, Merabet and Pascual-Leone 2010, Bubic et al. 2010). It is now scientifically accepted that the brain of non-sighted individuals compensates by recruiting visual areas of the brain in tactile and auditory tasks, and the extent of compensation does indeed correlate with enhanced behavioral performance.

Meanwhile, certain blind individuals, most famously Daniel Kish, learn to navigate through unfamiliar spaces using an echolocation technique, emitting clicking noises with the tongue and attending to the echoes in order to sense approaching obstacles. This skill develops over time and can be learned, and, indeed, Kish runs training workshops to teach echolocation to blind subjects. Kish himself makes the distinction between the modalities and their proximal and distal qualities that we have encountered with TVSS, in this case prioritizing audition and the spatial properties of acoustics. In an *ABC News* article tellingly entitled “Like a Bat, Blind Man Uses Sound to ‘See’,” Kish explains in his own words: “We can kind of think of echolocation as being sort of far vision; it’s good for things that are far away and off the ground [...] The cane is good for things that are nearer and at ground level” (in Moisse 2011). This repurposing of parts of the visual cortex for other tasks has been verified in the laboratory. Thaler, Arnott and Goodale (2011) have published fMRI data on Kish, who lost his sight in childhood, and another subject who lost their sight in adolescence, indicating that the primary visual cortex is involved in the utilization of echo information for detecting objects in space. In other words, the self-motivated learning of echolocation has caused the visual cortex to become involved in a non-visual spatial task, just like a TVSS system. Neuroplasticity can involve changes in the number and strength of synaptic connections, metabolic changes, and even the growth of new neurons (*neurogenesis*) in the adult brain, although neurogenesis is not implicated in sensory substitution. What is essential for the effective operation of TVSS is either the growth or reinforcement of peripheral connections from the substituting modality (touch or audition, in the above cases) to the central brain areas which typically receive information from vision. This allows for the substituting modality to receive stimulation in a format that is unusual for that modality—for example, the optic flow information in TVSS, above—and

for that stimulus to be interpreted in an appropriate way, such as the “looming” object previously described. Strictly speaking, this adds little to any discussion of the Molyneux question (see above), but any evidence of neuroplasticity through neurogenesis would certainly aid with the lower bar of cross-modal transfer (option 2) (p. 342), and therefore MMQ.

Other experiments involving the surgical rewiring of sensory pathways to the cortex demonstrate the brain’s ability to alter in response to changes in perceptual input. Mriganka Sur and his team at MIT operated on newborn ferrets in one brain hemisphere, rerouting the optic nerve previously connected to the visual cortex to the auditory cortex, the brain area associated with audition (Sur et al. 1990; discussed in Noë 2009: 53–54). Some might assume that, upon waking, the ferrets would hear with their eyes, but, of course, Sur’s team showed instead that they experienced vision through the auditory cortex. The link between brain areas, in this case the visual and auditory cortices, and their associated sensory experiences was demonstrated to be plastic or malleable. Not only is this a rather impressive illustration of cortical plasticity, but, through the observation of the ferrets seeing with the auditory cortex, it suggests an underlying functional equivalency. As Bavelier and Neville write, “Such results confirm that sensory inputs have a central role in specifying the functional architecture of the brain regions that they contact” (2002: 445). In other words, as in the neonatal ferrets, the brain will reorganize its usual functional areas in order to accommodate a deprivation of sensory input, such as blindness or deafness. But this neuroplasticity is not limited to neonates. Significant levels of plasticity have been observed in experiments involving mature animals, although not on the same scale as the neonatal mammals (Rauschecker and Knierp 1994, van Brussel et al. 2011). Nevertheless, the immature brain has a degree of plasticity that the adult one loses, and for this reason Bubic et al. (2010: 368) recommend introduction to SSDs as early as possible in childhood to maximize the potential benefit.

Sensory substitution is possible because of functional similarities across certain modalities and can be thought of as expanding the repertoire of tasks for which touch uses object-centered representations. However, not all functions within modalities are comparable, a fact that highlights the inevitable limitations of physiological factors when comparing not just eyes with hands but also eye movements with hand movements. This is because plasticity also occurs in motor areas of the brain, regions involved in orchestrating the movements of eyes and hands. As we have seen, acclimatization and practice in controlling the TVSS camera is crucial to developing proficiency. This is because perception is at least in part a sensory-motor skill (Findlay and Gilchrist 2003; Noë 2004), and the phenomenology of touch being translated into visual terms is not automatic or instantaneous, as we have seen. To effectively substitute seeing for touch, the subject must learn a pattern of movements that optimize the capture of visual information in TVSS, and these must become automatic through long-term structural changes in the brain. The blind subject’s active control of the TVSS camera is a requirement for learning to interpret the vibrotactile patterns. Efficient manipulation of the camera is essential for strong perceptual performance, a sensorimotor skill that develops with prolonged use of TVSS. However, if the subject’s viewpoint is controlled through directing the head-mounted camera, this involves always pointing the camera toward a scene in order to interpret it, and therefore continually orienting the head in its entirety. This will never be as fluid or rapid as the automatic and largely unconscious control of eye movements that we perform every day to fill in a visual scene in terms of central and peripheral vision. Saccades, the type of eye movement used for most visual tasks such as scanning scenes, examining objects, and reading, are actually the fastest movements made by the human body. An adult engaged in a natural viewing task makes between three and five saccades each second, and saccadic reaction times can be as short as 100 milliseconds (Fischer and Weber 1993), whereas the minimum reaction time for a manual response is more than twice as long at 250 milliseconds (Kirchner and Thorpe

2006). The oculomotor system, which involves the unconscious muscular control of the eye's saccades, performs an extremely active perceptual process that TVSS systems are unlikely to replicate in the near future. If they were translated into the operations of a blind person using their cane, eye saccades would be an exceptionally rapid, continual, and spatially variegated prodding of a cane in order to determine the contents of the scene, and to accommodate any changes or updates in that scene. Until camera control for the non-sighted user can even approach the precision and rapidity of sighted oculomotor control, TVSS-enhanced touch can never be functionally equivalent to vision in that way. Once again, although sensory substitution is premised on an underlying plasticity, this highlights significant differences between the physiological implementations of various sense organs and their associated sensorimotor subsystems and places some firm (albeit not insurmountable) neurophysiological limits in terms of MMQ.

Nevertheless, iterative improvements in video resolution and the tactile array do help constitute a more functional tactile-cutaneous substitute for the visuospatial field for the blind. Even so, there is an enormous difference in the spatial resolution of pressure receptors on the skin compared with photoreceptors in the eye. Even if technological advances deliver TDUs with a far higher resolution than the 25×25 grid currently available, the device will meet the inherent limits of human vibrotactile discrimination and the density of nerve endings in the associated cutaneous surface (tongue, skin). Despite the possibilities of neurosensory cortical reorganization described above in terms of the reallocation of visual and auditory cortices, the number and distribution of cutaneous nerve endings is physiologically fixed and consequently not itself plastic. If one constrains the definition of "functional" sight to certain coarse discriminations or optically induced responses, such as the recognition of large projected shapes against a dark background, or the ability to dodge a looming object, Bach-y-Rita and Kercel (2003) argue that low tactile resolution is not actually an obstacle to TVSS replacing sight. The acuities attained through earlier incarnations of the "lollipop" TDU, as reported by Sampaio et al. (2001), remain relatively limited as a sighted person performing at this level would be classified legally blind. Recent media coverage (including television news, the BBC technology program *Click* in 2010, and the BBC science documentary *The Brain: A Secret History* in 2011) has demonstrated blind users performing rather impressive feats with TVSS, such as navigating obstacle courses or playing chess, but they clearly reveal the intensity of concentration necessary for those subjects to accomplish routine tasks that the sighted take for granted.

Despite the physiological limitations, the case studies and experimental findings contest the assumptions articulated earlier through Révész and Martin that the spatial properties of sensory systems are fixed and ultimately incommensurable. As is the case after the hypothetical restoration of sight in the Molyneux question, when the sense of touch is presented with information that was optical in origin and trained to respond to these stimuli, we have seen how new connections are forged between areas of the brain involved in touch and those normally involved in vision. A consequence is that the touch modality becomes more "vision-like," especially in its representation of the spatial location of objects at a distance from the body. Furthermore, following Gibson, just as a visual image is not felt as a local irritation of the retina, a TVSS image is not felt as a stimulation of the skin but, after acclimatization, offers up a visuospatial field to the user. The sense of touch need not literally feel in touch with the objects it perceives. Against the previous assumptions of incommensurate sensory-spatial fields of those such as Révész or Martin, then, through TVSS a sense usually characterized as proximal can indeed become distal. As such, the cross-modal plasticity observed following TVSS reveals something of the inherent complexity of the touch modality, in terms of how it represents objects in space, and again prompts us to question the limits of what a sense modality supposedly "is."

Conclusion: touch-like vision and vision-like touch

Ultimately, the experimentally observed phenomenon of neuroplasticity does not in itself suggest a positive answer to the Molyneux question or suggest any more general theory of an interchangeability of the senses, either. What SSDs offer, and TVSS in particular, is something rather intriguing for philosophers and cognitive scientists in the wake of the Molyneux question. It brings forth more touch-like forms of vision, or vision-like forms of touch, something extremely promising for congenitally and adventitiously blind subjects, especially those experiencing sudden blindness through injury. This is not the same as directly attempting to reengineer the touch system or create an artificial modality. Rather, TVSS technology simply transduces optical information into a format accessible to touch. The properties of the tactile system are then modified in ways described previously, but only as a result of physiological responses to the new kinds of stimulation. The fact that three-dimensional object information can be felt on the two-dimensional skin surface, including its spatial orientation and even occlusion by other objects, shows how the vision-like properties of TVSS and the underlying cortical plasticity are promising. Meanwhile, we noted that a major limitation of current iterations of the technology is the inability to approach the performance of natural vision. This is not only in terms of the difference in density of nerve endings in the retina versus the tongue but also the inability to perform eye saccade-like actions (i.e. scanning a scene) through tactile means. If the performance of TVSS is restricted by the nature of the sensory systems involved, then, it simply cannot be that these modalities are ultimately interchangeable and infinitely plastic. Instead, both here and elsewhere (Chirimuuta and Paterson 2014; Paterson 2016), I have pointed to evidence that there are areas of functional equivalences within sensory subsystems, revealing forms of neuroplasticity that emerge through demonstrations of TVSS but also equally by other processes such as perceptual learning, sensory loss, sensory deprivation and, perhaps unsurprisingly, Braille reading.

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